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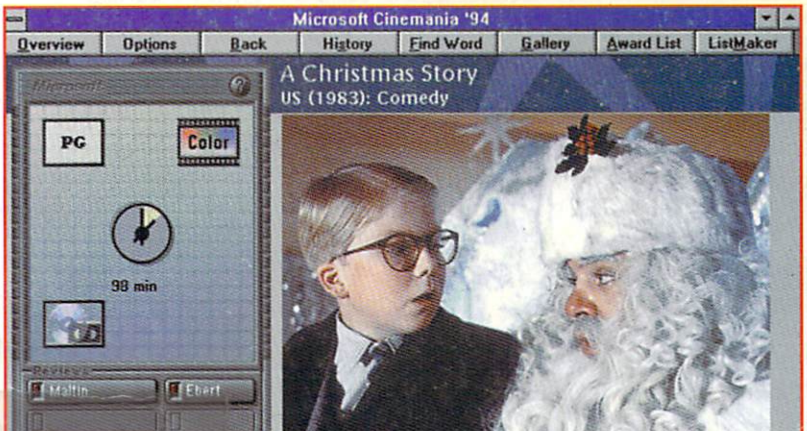
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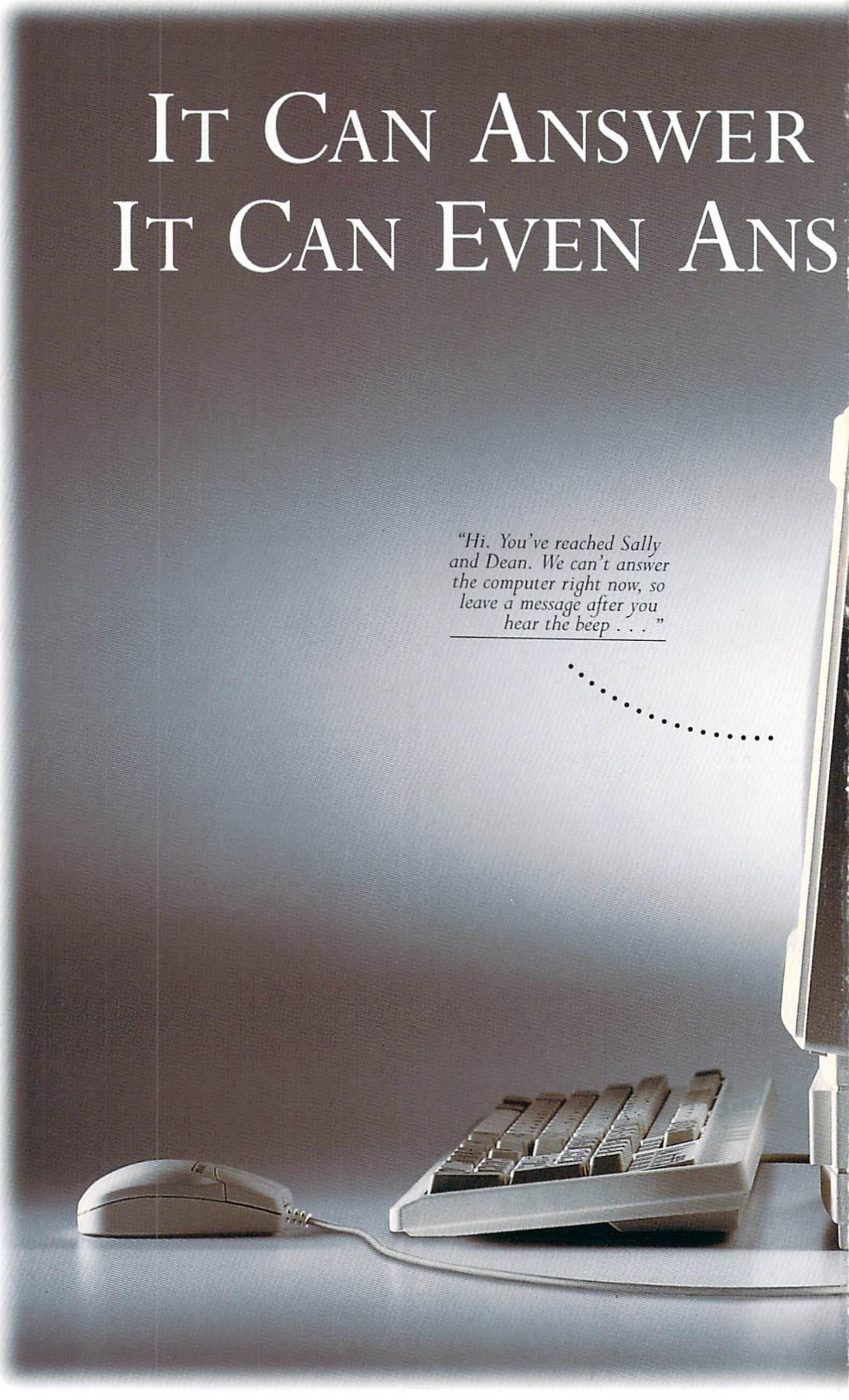

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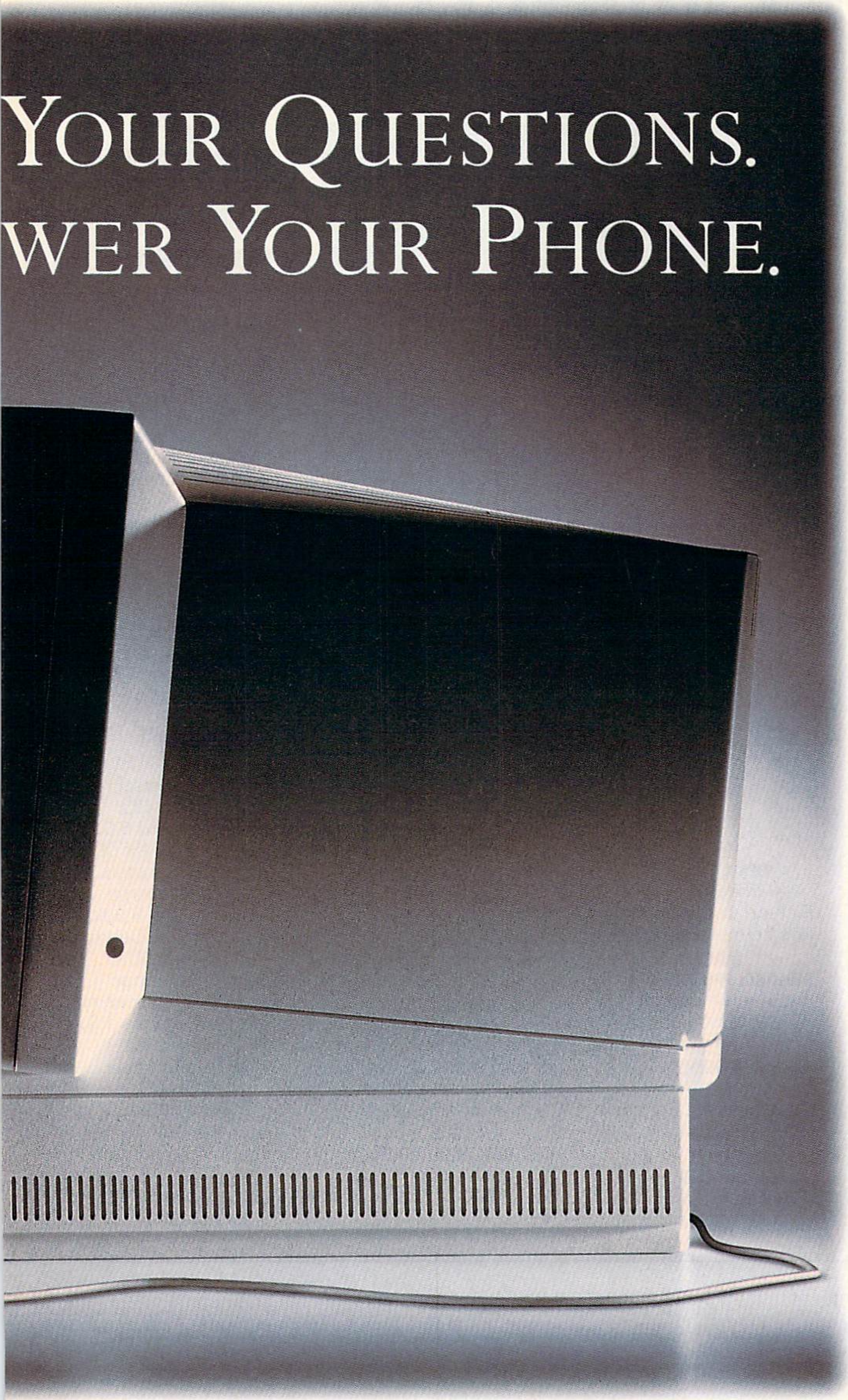

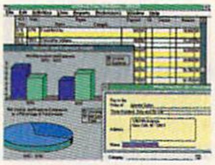

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Clifton Karnes

This issue's big story is the COMPUTE Choice Awards, and looking at the finalists, I was struck by how far the personal computer has come in the last ten years and by how critical graphical user interfaces, mice, laser printers, networking, and object-oriented programming have become to its success. Most of the software products in our finalist list are GUI based (most, in fact, run on Windows). Almost all of these programs support the mouse, and many—such as the desktop publishing and presentation programs—depend on laser printers for their final output. And communications (networking) software has become one of the fastest-growing categories in the last year. Lastly, many of these top programs were built with object-oriented techniques, and in fact, our programming-tool winner this year is an object-oriented programming language.

In this issue we honor our industry's present, past, and future.

COMPUTE
CHOICE AWARDS

The interesting thing about all these innovations is that they didn't come from Microsoft, Apple, or IBM, at least not initially. They originated someplace you probably wouldn't expect—Xerox.

As most of you already know, Xerox, which was originally called the Haloid Company, invented the photocopying process. It spent 15 years developing xerography, and when it finally brought it to market, the company was rewarded with instant success. Xerox realized, however, that paper was not the future. It felt that the future of the office lay in digital—computer—technology. To help it gain a foothold in this uncharted area, Xerox founded a research institute whose broad mandate was to discover the architecture of information. It built this institute in Palo Alto, California, and called it PARC, for Palo Alto Research Center.

To gauge just how impressive PARC's achievements were, we need to take a look at the computer situation in 1970, when PARC was founded. At this time, the mainframe computer was king, and most mainframes ran just one program at a time. As a programmer, you would create your program, punch it onto cards, and give it to a white-coated computer technician who would load it into the computer and run it. The next day or the next week, you'd get your results. In 1970, the cutting edge of computer technology was something called timesharing. In a timesharing system, there are several users connected to one computer, and each gets a portion of the computer's time. Using this model, the computer can serve more users, but with a slight degradation in performance.

At first, the researchers at PARC considered jumping on the timesharing bandwagon, but an insightful leader, Bob Taylor, saw beyond timesharing to the personal computer. In his vision, each user would have his or her own computer, connected to other personal computers so information could be shared.

Through Taylor's persistence and vision, PARC skipped timesharing and started working directly on building a personal computer. It succeeded and called its creation the Alto. It wanted the Alto to have a graphical user interface and a mouse, so it built that in. It also realized that a WYSIWYG display demanded a WYSIWYG printer, so it invented the laser printer (which is based on the xerographic process). Since laser printers were even more expensive then than now (the cost for the first ones ran around $30,000), it designed a way to connect the personal computers to the printer using cables and protocols. It called this Ethernet, the first local area network or LAN.

To make it easy for end users to program their machines, Alan Kay and a team of researchers developed one of the first object-oriented programming languages—Smalltalk.

It would be 15 years before the world at large would see these developments reach fruition, and none of the successes would come from Xerox.

With a combination of bad timing and inept management, Xerox failed to turn even one of these miraculous inventions into a viable product. PARC's seeds bore fruit in other people's gardens, however. PARC showed the GUI-based Alto to Steve Jobs and Bill Gates, for example, and it formed the impetus for Apple's Macintosh and Microsoft's Windows. And several researchers left PARC to found their own companies to develop products based on the ideas that originated at PARC.

Why did Xerox ignore these breathtaking innovations? The answers are complex, but they're put forth well in *Fumbling the Future* by Douglas K. Smith and Robert Alexander (Morrow, 1988), which has been the basis for most of my PARC info.

The point of this bit of history is that the five most important technologies in the last 20 years were all created at PARC: the personal computer, the graphical user interface, the laser printer, the local area network, and object-oriented end-user programming. In this issue, we're honoring the winners of the COMPUTE Choice Awards, but I'd like to take a moment to honor the men and women at PARC who invented our future. ☐

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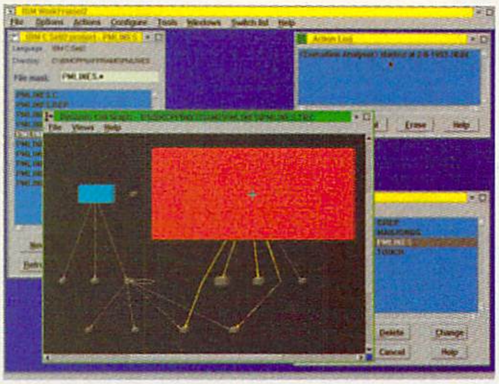

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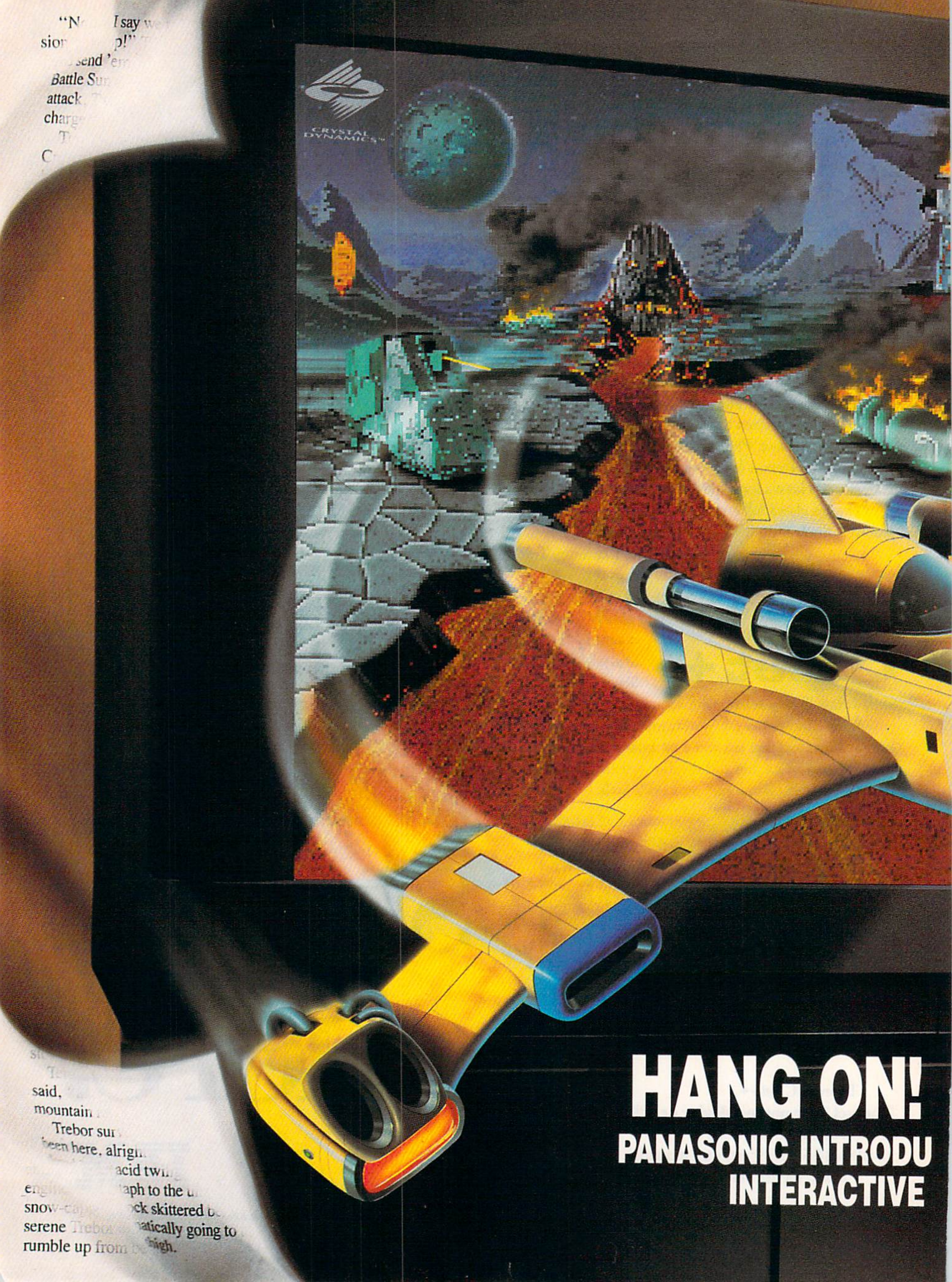
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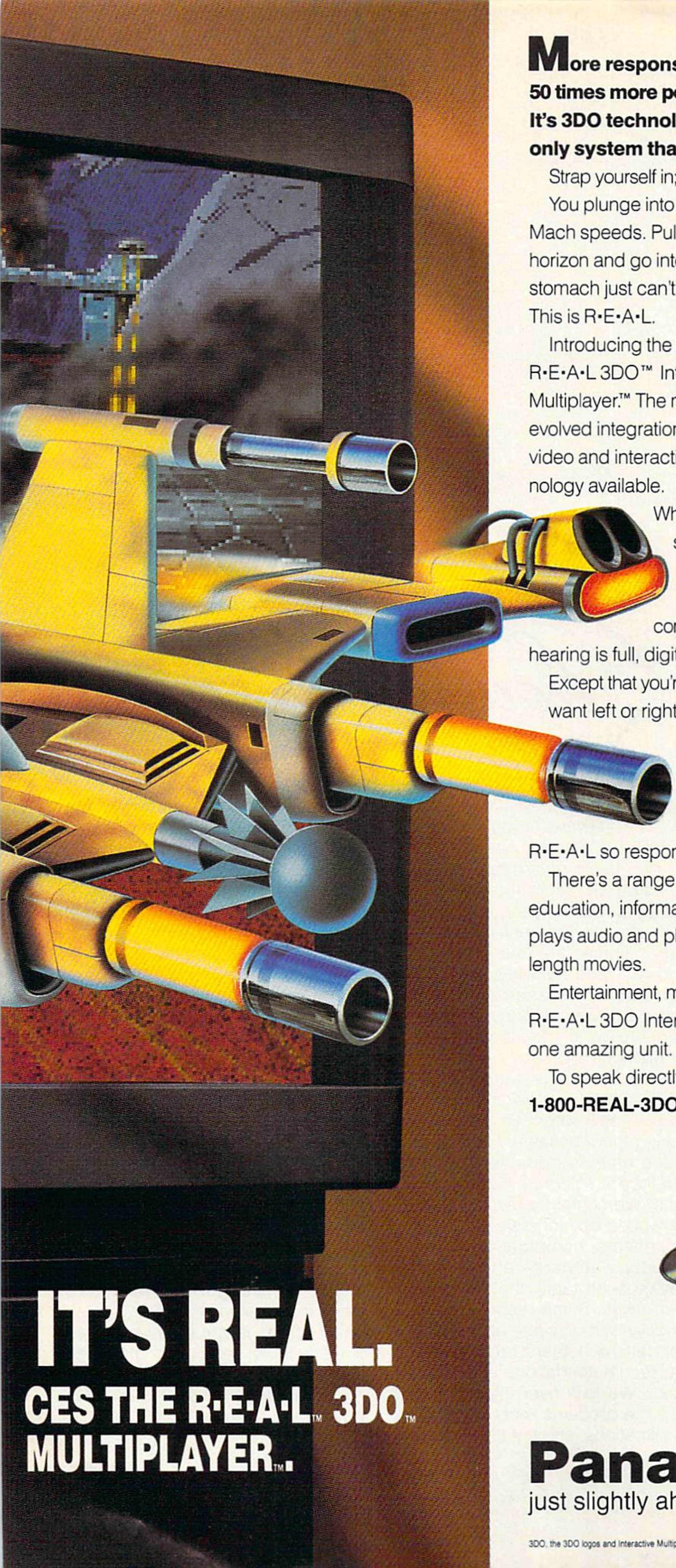
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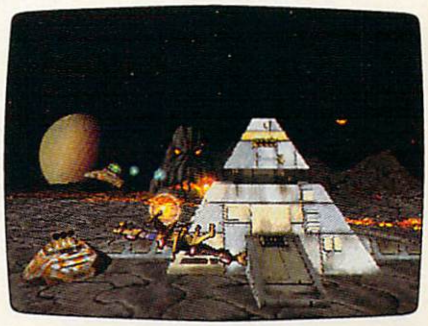
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Honoring the 25 best products of the year

COMPUTE Choice Awards

Each year, COMPUTE honors the best hardware and software products with the COMPUTE Choice Awards. From the hundreds of products we see annually, we select the finest in 25 categories. Every year, it gets harder to choose the finalists and winners, because the overall quality of hardware and software products is improving. Because of our lead time, each year's awards also cover products released at the very end of the previous year.

What does it take to be a COMPUTE Choice Award finalist? I always know when it's time to start picking them because I start getting phone calls from publicists asking how they're selected. Here's how it's done. We contact a few dozen people whose opinions we value—writers, editors, computer enthusiasts, industry watchers—and ask what they've seen lately that really blew them away. Some respond enthusiastically with only one or two recommendations. Others reply with several recommendations in every category. We look over the lists, make sure the products meet the editors' qualifications, and set about narrowing the list. In other words, every product listed here, whether a finalist or a COMPUTE Choice Award recipient, is a winner.

The changes from other years include a heavier reliance on Windows as the operating system of choice. Less and less outstanding software is originating in DOS. More products, like Claris Works and Lotus Improv, are challenging the existing metaphors and seeking out new ways of visualizing and working with information.

In some areas, the race seems to be tightening considerably among the major contenders. In laptop computers, graphics, and desktop publishing, for example, you will see familiar names and faces from years past. But while the distinctions among products in some areas become clearer, in other areas (operating systems and environments, for example) the waters just seem to be getting muddier.

All of this is great news for software junkies. Instead of one right way of doing things, you will find many divergent ways of getting work done and having fun on your computer.

Edited by Robert Bixby

COMPUTE
CHOICE
AWARDS

Word Processor

Microsoft Word for Windows 6.0

Microsoft Word for Windows has always been king of the hill in Windows word processors. With Ami Pro and WordPerfect for Windows, both of which are excellent products, the competition's hot, but for our money, Word for Windows 6.0 is still the one to beat.

WinWord made the toolbar famous, and since the features accessed by its toolbar are at the heart of the program, let's take a quick toolbar tour. Going from left to right, you'll find buttons for opening and saving files; printing; print preview; checking your spelling; cutting, copying, pasting, and format painting; undoing and redoing; autoformatting; inserting tables; setting columns; entering drawing mode; inserting charts; showing special symbols; zooming; and calling help.

WinWord 2.0 fans will recognize several important additions in the toolbar list. The format paint button can copy formats from one paragraph to another. Undo and redo offer multiple levels, unlike the single undo in 2.0. Autoformat takes your data and formats everything from paragraphs to characters based on a style you select. The drawing button actually turns WinWord into a graphics program, which lets you draw right on the page. And the zoom tool is a combo box that lets you specify almost any scaling for your pages.

Below this toolbar you'll find the ribbon, with options for style, font, character styles (bold, italic, and underline), justification, and so on. In addition, you'll find five other toolbars you can use, customize, and display at your option.

You won't see this feature on the toolbar, but WinWord 6.0 has a built-in autocorrection module that automatically changes typos like *THe* to *The* and *recieve* to *receive.* You can edit the correction dictionary to cope with your own idiosyncratic typing errors and turn this feature on or off.

Having thoroughly researched user's wants and needs, Microsoft sets a new standard in word processing with Word for Windows 6.0, a product that's amazingly powerful, intelligent, and well designed.

CLIFTON KARNES

Microsoft Word for Windows 6.0 (Microsoft)
Circle reader service number 325

Other Finalists

Claris Works (Claris)
Circle reader service number 326
WordPerfect 5.2 for Windows (WordPerfect)
Circle reader service number 328
WordPerfect 6.0 for DOS (WordPerfect)
Circle reader service number 327

Spreadsheet

Quattro Pro for Windows 5.0

The spreadsheet war continues to escalate. Each new version of the most popular spreadsheets adds features and ease of use. In a tight race this year, Lotus 1-2-3 for Windows Release 4 ran a close second, earning itself an honorable mention, but Quattro Pro for Windows 5.0 came out on top, the winner both because of its feature set and because of its unheard-of introductory price of $49.95 (the product will be regularly priced at $99.95).

$139
Borland Paradox for Windows
5.0
Borland Quattro Pro
Workgroup Edition

We've always liked Quattro's notebook feature and its easy-to-use SpeedBar. This new version has added more SpeedBars (which can be available or hidden). Borland has added a SpeedBar Designer so you can create your own SpeedBars using built-in or custom controls. The new spelling checker (available on the $495 Quattro Pro for Workgroups version) is also a nice feature. The spelling checker suggests words and lets you build custom dictionaries—a feature we've always wanted on our spreadsheets.

Getting help with Quattro has been made more convenient, particularly as the number of items available on the SpeedBar increases. In addition to the instant help that appears when you move the pointer over an icon, Borland has included what it calls Object Help. With Object Help it's easy to get more information about each item by simply pointing and clicking. If the short help isn't enough, just click on the Help button that appears, and you'll receive more in-depth information. It's all very convenient, and it takes us one step closer to not needing the manual.

Quattro Pro for Windows excels as an easy-to-use spreadsheet for beginners, but it's also a powerful, complex tool for those who need a full-featured number-cruncher.

STEPHEN LEVY

Quattro Pro for Windows 5.0 (Borland International)
Circle reader service number 331

Other Finalists

Lotus Improv (Lotus Development)
Circle reader service number 330
Lotus 1-2-3 for Windows Release 4 (Lotus Development)
Circle reader service number 329

Database

Paradox for Windows 1.0

Paradox for Windows is a beautifully designed database program that has something for beginners and pros alike. With its intuitive design tools, tyros can get databases up and running quickly without writing a line of code, and pros have a powerful built-in language at their disposal for demanding tasks.

When you run Paradox for the first time, you'll see what looks like a typical Windows application with a menu bar and a toolbar (Borland calls its toolbar a SpeedBar) with buttons for opening a table, form, query, report, script, or library, as well as ones for opening a folder and adding and deleting folder items.

Forms are the heart of most databases, and designing a form in Paradox for Windows is a pleasure. You can move and resize all of a form's fields, and more important, you can change a field's properties by simply right-clicking on it. When you do, you'll see a pop-up menu with a list of entries, each of which is a cascading menu, so choosing one calls a submenu.

Paradox for Windows' main competition in databaseland is Microsoft Access, and the two have been battling head to head for about a year. Both are superb programs with excellent design tools, both are easy to use, and both were COMPUTE Choice Award finalists. Our decision for the

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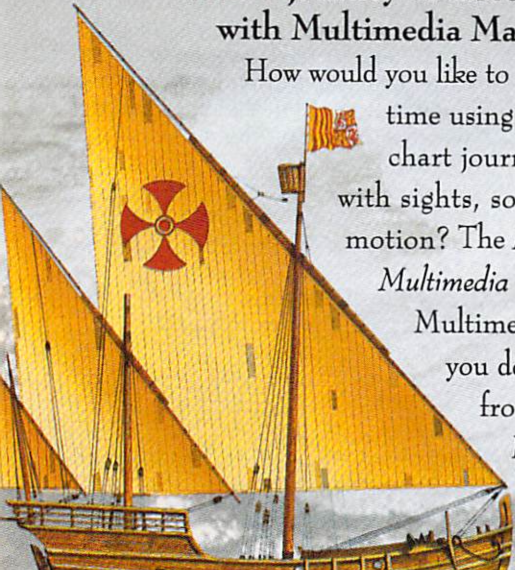

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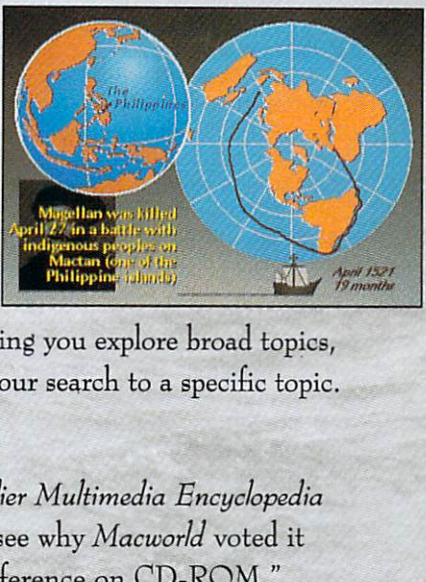
The Philippines
Magellan was killed April 27 in a battle with indigenous peoples on Mactan (one of the Philippine islands)
April 1521
19 months

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Circle Reader Service Number 187

best database came down to a choice between these two tools, and because of its innovative design, Paradox edged out Access, which still rates an honorable mention. In fact, Paradox for Windows is so well built that it's actually fun to use.
CLIFTON KARNES

Paradox for Windows 1.0 (Borland International)
Circle reader service number 332

Other Finalists

Approach 2.1 (Lotus Development)
Circle reader service number 333
FoxPro for Windows (Microsoft)
Circle reader service number 334
Microsoft Access for Windows (Microsoft)
Circle reader service number 504
SuperBase 2.0 (Software Publishing)
Circle reader service number 335
Q & A for Windows 4.0 (Symantec)
Circle reader service number 336

Communications

WinFax Pro 3.0

In just a few short years, we've become accustomed to faxing from our computers. It's remarkable that we take it for granted—that working as a fax machine should be just another function of our computers. Much of the credit should go to Delrina for its WinFax Pro.

First released in January 1991, WinFax has remained the most popular PC-based fax program and is still the best overall. The current incarnation, WinFax Pro 3.0, adds annotation and drawing tools (allowing you to mark up faxes with text and graphics), OCR (using Caere's AnyFax pattern recognition technology and a built-in spelling checker), fax document management (letting you categorize, compress, save, sort, and search both incoming and outgoing faxes), an improved phone book (offering a variety of description fields, as well as import from and export to common file formats), a cover-page designer (supporting both the Windows Clipboard and OLE), image processing (featuring antialiasing technology and random noise cleanup), scanner support (including TWAIN compatibility), and Cover-Your-Fax (providing 100 professionally drawn cover pages).

Despite all the features, WinFax Pro 3.0 is still easy to use. After a relatively painless installation, you simply switch to the WinFax printer driver and print your document as though you were sending it to a printer. WinFax intercepts the data and sends it to your fax/data modem. It's that simple.

An honorable mention goes to Crosstalk for Windows 2.0, an already-strong Windows-based communications program with a greatly improved interface. (For a complete review of Crosstalk for Windows 2.0, see the October 1993 COMPUTE.)
DAVID ENGLISH

WinFax Pro 3.0 (Delrina)
Circle reader service number 337

Other Finalists

America Online for Windows (America Online)
Circle reader service number 338
WinCIM 1.0 (CompuServe)
Circle reader service number 345
Crosstalk for Windows 2.0 (DCA)
Circle reader service number 340
InterNAV (General Videotex)
Circle reader service number 339
Eclipse Fax (Phoenix Technology)
Circle reader service number 342
ImagiNation (Sierra On-Line)
Circle reader service number 343
Norton PC Anywhere for Windows 1.0 (Symantec)
Circle reader service number 344
DataFAX for Windows (Trio Information Systems)
Circle reader service number 341

CENTRAL POINT
PC TOOLS
FOR WINDOWS
WinFax PRO
with OCR
3.0

Money Management

Quicken 3.0 for Windows

Quicken for DOS was a big hit, and Quicken for Windows is even better. In fact, Quicken 3.0 for Windows is the best financial management program we've seen.

Quicken is a personal financial manager that, at its heart, is a checkbook program that both manages your checkbook and prints checks. It does these things extremely well, but there's much more to Quicken 3.0. It can track your investments and manage credit card accounts and trusts, to name just a few accounts; and it can print reports that include net worth, budgets, income and expenses, and cash flow. It also keeps track of tax-deductible contributions, and it can serve as an accounting package for most small businesses. Add-on modules like Quick Invoice and Quicken Companion can handle everything from home inventory management to invoice generation, printing, and tracking.

Quicken's MDI sports a colorful toolbar with buttons for commonly used tasks. Each module presents lots of information, but the forms are so well designed that they're easy to grasp and use. And data entry is easy because almost everywhere the program anticipates what you want to do by searching incrementally and intelligently filling in fields.

Quicken 3.0 keeps its predecessors' motto of Safety First, saving your data with each entry. And it encourages you to back up your files. Add to this the ability to remind you of payments due, the best data entry forms in the business, and an interface that improves with each release, and you have an excellent program.
CLIFTON KARNES

Quicken 3.0 for Windows (Intuit)
Circle reader service number 349

Other Finalists

Kiplinger's CA-Simply Money 1.0 (Computer Associates)
Circle reader service number 346
Microsoft Money (Microsoft)
Circle reader service number 347
Peachtree Accounting for Windows 2.0 (Peachtree Software)
Circle reader service number 348

Utility

PC Tools for Windows

Central Point's PC Tools for Windows is bigger and sleeker (and more expensive) than its DOS version. It contains replacements for the Windows desktop and File Manager, a backup program, data recovery for trashed disks or files, an antivirus utility, a system analyzer, a disk optimizer, and a scripting language similar to BASIC. A scheduling program and some wildly creative but undocumented screen savers are thrown in for good measure.

Multidesk, the program's re-

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Multiple Zoom Levels	●	●	●
Publishing Templates	●	●	●
Irregular Text Wrap	●	●	
Styles	●	●	
Pantone® Colors	●	●	
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Free & Frame Text	●		
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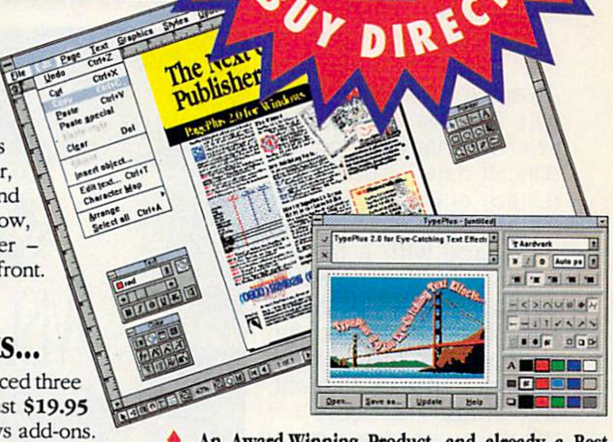

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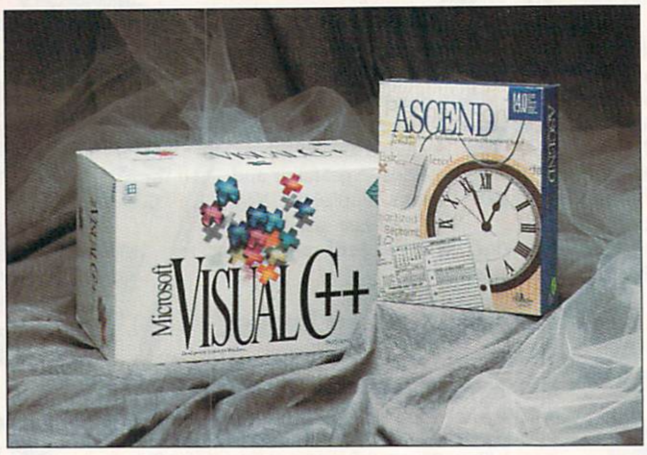
Circle Reader Service Number 120

placement for the Windows desktop, contains some of the best features to be found in the product. It's arguably easier to learn and use than Program Manager, and it's demonstrably superior. The best features are QuickLauncher and multiple desktops. QuickLauncher lets you add program or folder names to the System menu and launch them from there, sort of like desk accessories on the Macintosh.

ScriptTools, the package's macro language, is the best such Windows script language I've seen. PC Tools has a whole range of file recovery programs. The installation process gives file recovery top priority. PC Tools for Windows gives you a really big bang for the buck.



A close contender for the COMPUTE Choice Award for the best utility was Stacker 3.1. An answer for many during the difficult days following the release of DOS 6, Stacker 3.1 served to replace DoubleSpace with a faster, friendlier (and some would say safer) alternative. It's difficult to make a decision between two products so powerful and so different, but since PC Tools for Windows provides a much wider range of utilities than Stacker 3.1, we felt the Central Point Software product should receive the award and Stacker 3.1 an honorable mention. Both are excellent products, however. (A review of PC Tools for Windows can be found in the November 1993 COMPUTE. Stacker 3.1 was reviewed in the October 1993 COMPUTE and discussed in "Data Under Pressure" in the same issue.)
TOM CAMPBELL

PC Tools for Windows
(Central Point Software)
Circle reader service number 350

Other Finalists
Pizazz Plus 4.0
(Application Techniques)
Circle reader service number 355
NETROOM 3 (Helix)
Circle reader service number 354
Dashboard for Windows
(Hewlett-Packard)
Circle reader service number 352
Collage Complete (Inner Media)
Circle reader service number 351
Transom (Metro Software)
Circle reader service number 358
DynoPage 1.0 (Portfolio)
Circle reader service number 353
QEMM 7.01 (Quarterdeck Office Systems)
Circle reader service number 356
Stacker 3.1 (STAC Electronics)
Circle reader service number 357

Personal Information Manager

Ascend 4.0

I can't imagine life without Ascend. There are very few programs I can say that about, but Ascend is definitely one. If fact, it's probably my most important tool. Ascend is a Windows-based personal information manager, or PIM. And like most PIMs, it manages diverse types of information, including a prioritized daily task list, an appointment schedule, calendars, a master task list, a telephone and address book, a journal, a database, and much more.

Ascend was developed by Franklin Quest, a time management consulting company that has been teaching time management techniques and selling paper-based Franklin Planners for years. The Franklin method is based on a top-down approach to time and task management with the final goal of inner peace, something most of us feel is not only worthy and desirable, but seemingly unattainable.

Ascend's interface is a joy to use. It's a colorful MDI application, with windows for each module. To make navigating these modules easy, there's a button bar with one button for each module. You can customize this button bar and determine which buttons go on the bar and in what order.

One of 4.0's best features is drag and drop. You can drag and drop data between most modules, and most modules also support OLE. In addition, Ascend can make beautiful printouts of your task list, appointments, notes, and more on Franklin Day Planner paper or regular-size laser paper.

An honorable mention in this category goes to Arabesque's ECCO. It has an innovative design based on outlines and is both powerful and easy to use. But with features galore, power to burn, and its intuitive interface, Ascend wins by a hair. (A full review of Ascend 4.0 can be found in the May 1993 issue of COMPUTE.)
CLIFTON KARNES

Ascend 4.0 (Franklin Quest)
Circle reader service number 359

Other Finalists
ECCO Professional
(Arabesque Software)
Circle reader service number 360
ManagePro 2.0 for Windows
(Avantos Performance
Systems)
Circle reader service number 362
Sharkware 1.0 (CogniTech)
Circle reader service number 364
Lotus Organizer 1.1
(Lotus Development)
Circle reader service number 365
Info Select for Windows
(Micro Logic)
Circle reader service number 361
PackRat 5.0 (Polaris)
Circle reader service number 363

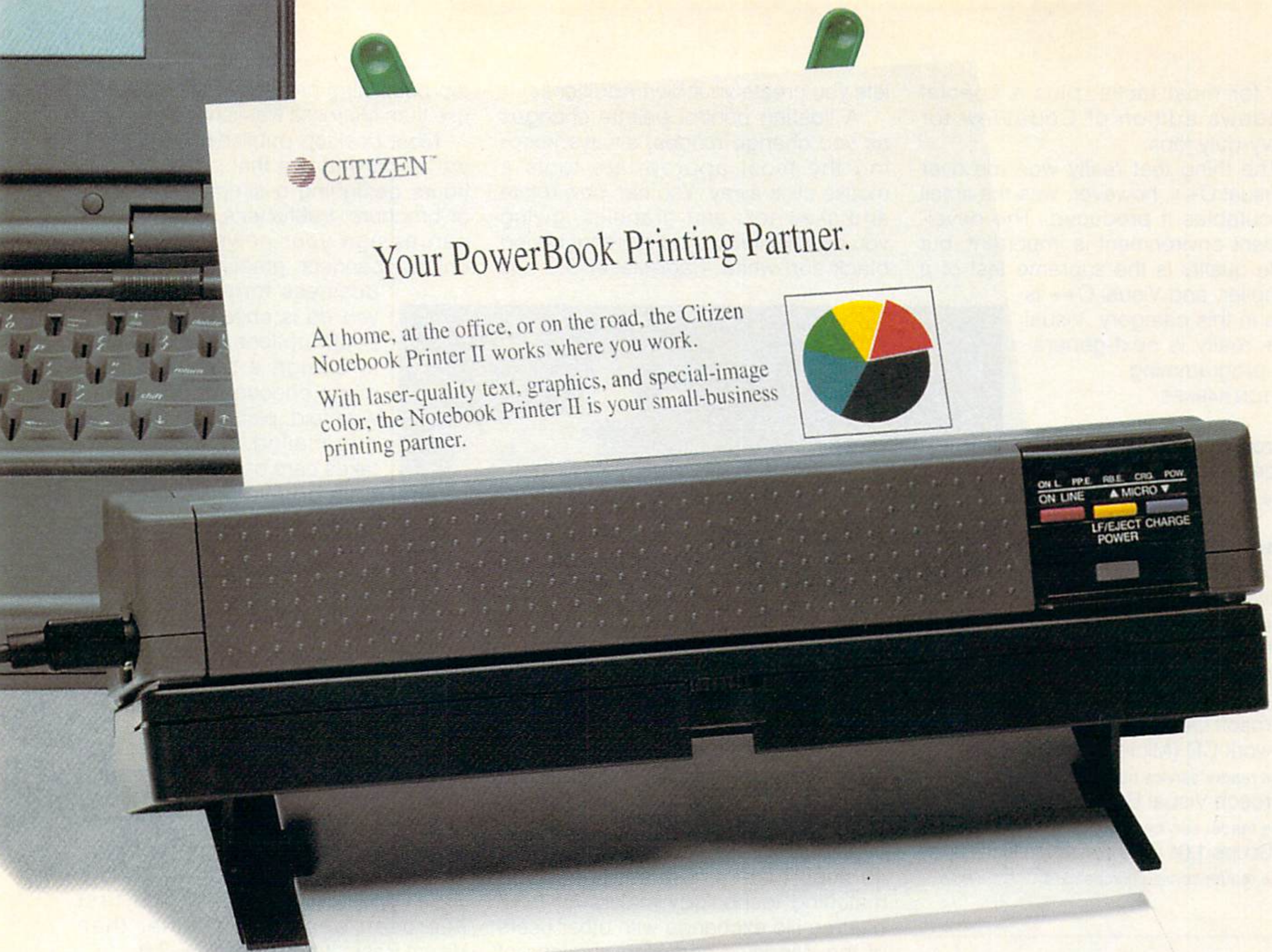
Programming Tool

Microsoft Visual C++

Visual C++ is an elegant development environment that comes with a host of superb programming tools. The heart of the system is Visual Workbench, which is the Windows-based integrated environment. It boasts a toolbar for quick access to common commands; a syntax-highlighting editor; and a Tool menu, to which you can add your own commands.

Another key tool is App Studio, which you can use to edit all your resources, including dialog boxes, icons, cursors, menus, and bitmaps. The next two major Visual C++ tools are specifically for C++ programmers: AppWizard, which is a program generator, and ClassWizard, which handles all the red tape associated with managing classes and message maps. All of these tools are more than just excellent modules; they're very well integrated and exceptionally easy to use.

Often the key to successful development is a first-rate debugger, and here, Visual C++ shines. There's an integrated debugger, which will suf-



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Circle Reader Service Number 174

fice for most tasks, plus a special Windows edition of CodeView for heavy-duty jobs.

The thing that really won me over to Visual C++, however, was the small executables it produced. The development environment is important, but code quality is the supreme test of a compiler, and Visual C++ is tops in this category. Visual C++ really is next-generation programming.

CLIFTON KARNES

Microsoft Visual C++ (Microsoft)
Circle reader service number 366

Other Finalists

RoboHELP 2.0 (Blue Sky Software)
Circle reader service number 370
Borland C++ for OS/2 (Borland International)
Circle reader service number 367
Microsoft Developers' Network CD (Microsoft)
Circle reader service number 368
Microsoft Visual Basic 3.0 (Microsoft)
Circle reader service number 369
WinScope 1.01 (The Periscope Company)
Circle reader service number 371

Professional Desktop Publishing

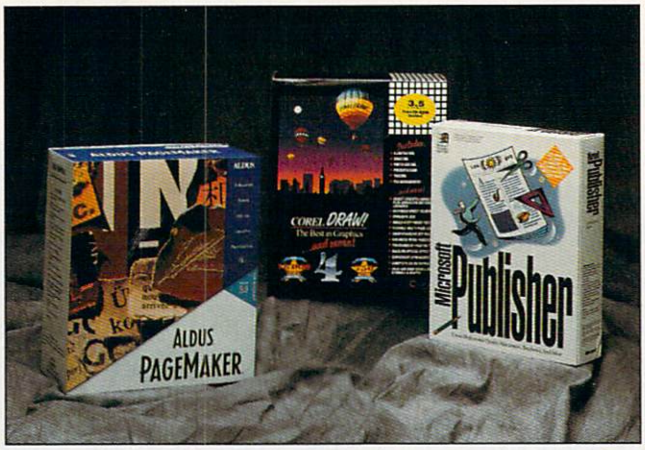
Aldus PageMaker 5.0

PageMaker 5.0 reclaims the venerable program's position as king of the desktop publishing hill. This latest release addresses nearly every complaint that users had about earlier versions, as well as adding a host of new features.

Gone are the quirks, such as problems with some high-color modes and a menu that would handle only a limited number of fonts. Added is a powerful suite of new features and an improved interface that can make page layout easier than ever. Whether you're publishing a church bulletin or a national magazine, you'll find this newest PageMaker has the capabilities you need.

The biggest improvement in PageMaker 5.0 is its ability to open multiple publications simultaneously, allowing you to compare documents or drag and drop elements between them. Aldus Additions is a set of macros that add functions such as automatic drop caps, running headers and footers, booklet generation, and page sorting; a new macro language lets you create your own Additions.

A floating control palette changes as you change modes, always keeping the most appropriate tools a mouse click away. You can now rotate and skew text and graphics, giving you new flexibility. And no more boring black-and-white: PageMaker 5.0 has built-in support for creating process color separations and includes a variety of color libraries from PANTONE, Trumatch, and others.



The program now has more than 40 import filters, and PANOSE font-matching technology makes for trouble-free file exchange with other users of the Windows and Mac versions of the program.

PageMaker was almost knocked out of the ring by QuarkXPress, but version 5.0 brings it back punching. (A review of PageMaker 5.0 can be found in the October 1993 COMPUTE.)

DENNY ATKIN

Aldus PageMaker 5.0 (Aldus)
Circle reader service number 372

Other Finalists

Compel (Asymetrix)
Circle reader service number 375
QuarkXPress for Windows 3.1 (Quark)
Circle reader service number 377
Harvard Graphics for Windows 2.0 (Software Publishing)
Circle reader service number 376
WordPerfect Presentations 2.0 for DOS (WordPerfect)
Circle reader service number 378

Personal Desktop Publishing

Microsoft Publisher 2.0

You can pay more money and get more features (PageMaker 5.0) or even pay less money and get more features (PagePlus), but you can't buy a desktop publishing program that's easier to use than Microsoft Publisher 2.0.

Most desktop publishing programs are so hard to use that people spend hours designing a simple newsletter or brochure. Publisher's PageWizards can design your newsletters, brochures, banners, greeting cards, and business forms for you; all you do is choose the appropriate options. For example, to design a brochure, you might choose modern style, side-fold, picture on the front, and mailed, and Publisher takes care of the rest.

In addition, Publisher includes a new online adviser, called Cue Cards, which provides step-by-step design help with the click of a mouse, and Quick Demos, which provides onscreen demonstrations of a variety of desktop publishing tasks.

This latest version of Publisher has greatly improved typography (you can now hyphenate text and wrap text around graphic objects) and a more powerful Word Art (you can now use this stand-alone special-effects type program with any TrueType font). It's also the first Microsoft application, other than Visual Basic, to support OLE 2.0.

Microsoft Publisher 2.0 ships with 17 PageWizard design assistants, 35 professionally designed templates, 20 TrueType fonts, 100 border designs, and 125 clip art images. Its power and ease of use make Publisher a great way to get started with desktop publishing.

An honorable mention goes to PagePlus. Although this program's price fits into the Personal Desktop Publishing category, its feature set makes it a real contender in the professional arena. (See this month's "Productivity Choice" for an in-depth look.)

DAVID ENGLISH

Microsoft Publisher 2.0 (Microsoft)
Circle reader service number 379

Other Finalist

PagePlus (Serif)
Circle reader service number 374

Illustration

CorelDRAW! 4.0

Corel has begun an ambitious effort to upgrade CorelDRAW! annually and retain its previous version on the market for sale at a discounted price. This is both extremely generous and extremely savvy. Any unsold copies of

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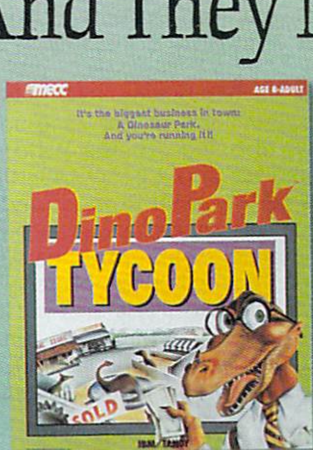

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the previous version can be cleared from the distribution channel while a completely revamped version is introduced. Corel has proven itself generous and savvy throughout the reign of CorelDRAW! as the top-selling Windows illustration and design software, and version 4.0 is no exception.

Corel is intent on pulling light years ahead of its competition. Despite the addition of new fractal fills and powerlines, CorelDRAW! 4.0 doesn't represent a massive overhaul of last year's 3.0 version, but throughout the program you can find important improvements. Each of its companion programs has also gone through an evolutionary change—adding and reorganizing in a general housekeeping effort.

One completely new feature in the package is CorelMOVE!, an animation product that makes creating animated panels for your CorelSHOW! presentations much simpler.

CorelDRAW! added pages, allowing you to create a publication of up to 999 pages. This makes CorelDRAW! the most graphically intensive desktop publishing package ever. Among its many other attributes, the package has a graphical database and text editor (inside CorelDRAW!, including thesaurus and spelling checker) and a spreadsheet (within CorelCHART!). These enhancements put CorelDRAW! in competition in virtually every other software arena.

ROBERT BIXBY

CorelDRAW! 4.0 (Corel)
Circle reader service number 380

Other Finalists

Fractal Design Painter 2.0 (Fractal Design)
Circle reader service number 384
Morph for Windows (Gryphon Software)
Circle reader service number 387
1st Design (GST Software)
Circle reader service number 381
Graphics Works (Micrografx)
Circle reader service number 385
Micrografx Designer 4.0 (Micrografx)
Circle reader service number 383
Pixar One Twenty Eight (Pixar)
Circle reader service number 382
Typestry for Windows (Pixar)
Circle reader service number 388
Visio (Shapeware)
Circle reader service number 389
ImagePals (U-Lead Systems)
Circle reader service number 386

Operating System

Nobody won. Put yourself in our place. Considering all of the problems people had with DOS 6 and the fact that there were only a few improvements over DOS 5 (and most of those in the form of utilities), we felt that we couldn't in good conscience give it the COMPUTE Choice Award. A new version of DOS 6 looms in the near future, but it's too late to give it the thoroughgoing testing we'd require to make sure it didn't have problems as bad as (or worse than) the current version.

To be fair, the problems DOS 6 experienced were generally as a result of improper use of perfectly functional utilities and commands. However, a modern operating system shouldn't lead a user into a quagmire.

GeoWorks Ensemble 2.0 is a huge improvement in features and power over its predecessor, but it has been an insular environment with applications lacking the kind of innovation third-party developers would bring. It was designed for trailing-edge machines, and its makers no longer seem interested in competing head to head with Windows.

Windows NT and NetWare 4.0 are network operating systems of limited interest at most to a majority of our readers.

OS/2 2.1 has proven itself to be a favorite of techies, at last living up to its claim of being a better Windows than Windows and a better DOS than DOS (see "Personal Productivity" in this issue for a user-oriented review of this operating system), but there's a dark cloud on the horizon. Microsoft is now free to make alterations in DOS and Windows that will make future applications incompatible with OS/2. So, while version 2.1 is fairly compatible with DOS 6 and Windows 3.1, it looks like a long game of catch-up for OS/2 and its users in the future.

Though we decline to choose an operating system or environment for the COMPUTE Choice Award, you shouldn't hesitate to employ any of these products for your personal use, as appropriate to your equipment and your work.

ROBERT BIXBY

Finalists

GeoWorks Ensemble 2.0 (GeoWorks)
Circle reader service number 391
OS/2 2.1 (IBM)
Circle reader service number 393
DOS 6 (Microsoft)
Circle reader service number 390
Windows NT (Microsoft)
Circle reader service number 394
NetWare 4.0 (Novell)
Circle reader service number 392

Desktop Computer

Dell 466/M

Our winner in this category is the Dell 466/M. But as often happens in the computer industry, that model was superseded after less than a year on the market. However, its replacement, the Dell OptiPlex 466/MX, embodies all the qualities that made the 466/M a COMPUTE Choice Award winner—and packs some new innovations as well.

The blazing 486DX2/66 system was the fastest that we tested in our recent 486 Test Lab, and its local-bus video turned in one of the fastest 3D-Bench results we've ever seen. We chose the Dell 466/M because it sported a top-of-the-line feature set at a midrange price. Along with its fast processor, it also has an easily updatable Flash-ROM BIOS; automatic port sensing (if you plug in a modem card at COM2, for instance, it will remap the second motherboard port to be COM3); a case which can be opened without a screwdriver; five open slots and five drive bays, allowing for plenty of expansion; and sockets for 72-pin SIMMs, which greatly simplify RAM expansion. Dell will install and configure any software and peripherals you purchase with the system, making it a great plug-and-play solution for the novice PC user.

The 466/MX has lightning-fast motherboard-based local-bus video, just like the 466/M. However, it also

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Circle Reader Service Number 161

has two VL slots for upgrading video or for installing VL-Bus peripherals. It also sports an upgradable case, so you can purchase the slimline, three-slot model and upgrade it to the full-size five-slot setup. Although it's not the least expensive system you'll find, you'll have a hard time finding one better built or better supported.

DENNY ATKIN

Dell 466/M (Dell Computer)
Circle reader service number 395

Other Finalists

Evolution IV (ALR)
Circle reader service number 396
Quadra 840AV (Apple)
Circle reader service number 398
Gateway 2000 4DX2/66V (Gateway 2000)
Circle reader service number 397

Laptop/Notebook Computer

OmniBook 300 and Gateway 2000 Handbook 486

The OmniBook 300 sounds almost too good to be true: a notebook computer that runs Windows, Word for Windows, and Excel from a ROM card; weighs only 2.9 pounds; and gets an incredible nine hours of battery life with continuous use. It even includes a built-in mouse that pops out when needed and slides back for traveling. It's the closest thing yet to a road warrior's dream machine.

The trade-off is a nonbacklit screen. Fortunately, it's one of the best reflective LCD screens around. In bright to moderately bright light, you shouldn't have any trouble reading it, but in extremely dim light, you'll have to refrain from computing altogether or seek out the nearest light.

The OmniBook comes in two models: one with a 40MB hard drive and one with a 10MB Flash-RAM card. Both storage devices are automatically compressed by the built-in DoubleSpace compression (essentially doubling the capacity of either card), and both are PCMCIA cards (making them easy to upgrade later on). The hard drive model gives you more storage (80MB versus 20MB) for less money ($1,950 versus $2,375), but the Flash-RAM model can run as long as nine hours on the OmniBook's rechargeable battery, as well as run from four ordinary alkaline AA batteries. The hard disk model can run as long as five hours on the rechargeable battery or use four lithium AA batteries.

The OmniBook is nothing short of a technical marvel, with its light weight, compact size, all-PCMCIA storage, and small hideaway mouse. If you can live with the nonbacklit screen, the OmniBook is the state of the art for high-tech traveling. (A review of the OmniBook can be found in the October 1993 COMPUTE.)

DAVID ENGLISH

Last year, Gateway introduced the Handbook, packing a C & T PC-CHIP processor, a 40MB hard drive, and a backlit screen in a 2.9-pound package. Its portability made it an instant hit, but its CGA screen and 286-compatible processor were underwhelming in a market that had standardized on VGA and was already giving up on the 386.

Gateway responded with the Handbook 486, which maintains the original Handbook's 2.9-pound weight and compact 9.75- × 5.9- × 1.6-inch size, but gives you the computing power you expect on a desktop. This subnotebook is available in two models, one with a 25-MHz SL-enhanced 486SX and an 80MB hard drive for $1,495 and a portable powerhouse with a 40-MHz SL-enhanced 486DX2 chip and a 130MB drive for $1,995.

The Handbook 486 has a 7.9-inch backlit VGA display; a PCMCIA Type II slot; parallel, serial, and PS/2 ports; and a small stick-type pointing device next to the keyboard. The keyboard is almost full-size, only an inch smaller than a typical AT keyboard, and has a quiet touch that lets you take notes almost anywhere.

Both models ship with 4MB of RAM, expandable to 20MB. No floppy drive is included, but a transfer cable is included for use with Interlnk and your desktop PC.

The Handbook 486 and HP OmniBook 300 are both award-deserving portables. The Handbook has 486 power, a backlit screen, and more storage; the OmniBook has incredible battery life and the innovative pop-out mouse. With choices like these, the real winner is you.

DENNY ATKIN

OmniBook 300 (Hewlett-Packard)
Circle reader service number 400
Gateway 2000 Handbook 486 (Gateway 2000)
Circle reader service number 399

Other Finalists

Canon NoteJet (Canon)
Circle reader service number 401
Compaq Contura (Compaq)
Circle reader service number 402
Gateway 2000 Colorbook (Gateway 2000)
Circle reader service number 403
Thinkpad 720C (IBM)
Circle reader service number 406
WinBook (Micro Electronics)
Circle reader service number 408
NCR 3150 (NCR)
Circle reader service number 404
UltraLite Versa 2.5C (NEC Technologies)
Circle reader service number 407
Satellite T1900C (Toshiba)
Circle reader service number 405

Multimedia Hardware

Sound Blaster DigitalEdge CD and Fusion DoubleCD-16

Less than a month after the Multimedia PC Marketing Council announced the new Level 2 MPC specifications, both Media Vision and Creative Labs introduced inexpensive Level 2 upgrade kits. In keeping with the Level 2 specs, both include a 16-bit sound card capable of recording and playing back CD-quality sound, as well as a double-speed CD-ROM drive

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Circle Reader Service Number 168

that can play Kodak Photo CDs. Both upgrade kits are terrific buys, so we decided to let them share the award for the best multimedia hardware.

Creative Labs' Sound Blaster DigitalEdge CD includes a Sound Blaster 16 ASP, a double-speed multisession CD-ROM drive, The Software Toolworks Multimedia Encyclopedia, Microsoft Bookshelf, Macromedia Action!, a microphone, and speakers. Media Vision's Fusion DoubleCD-16 includes a Pro AudioSpectrum 16 sound card, a double-speed NEC CD-ROM drive (model 55J), Compton's Interactive Encyclopedia for Windows, Battle Chess Enhanced, Arthur's Teacher Trouble, and The 7th Guest.

How do you choose between them? It depends on what you need in an upgrade kit. If price is important, you're more likely to get a better deal with the Fusion DoubleCD-16, which lists for $699.00 (internal) and $799.00 (external), as compared to the DigitalEdge kit, which lists for $999.95 (internal). On the other hand, if you prefer a CD-ROM drive that doesn't need a caddy, need the microphone and speakers, and would like the option of upgrading your sound card to General MIDI, you might want to choose the Creative Labs package. The selection of CD-ROM titles might also sway your vote one way or the other.

Either way, you'll be ready for the more powerful Level 2 multimedia applications that will be appearing in 1994.

DAVID ENGLISH

Sound Blaster DigitalEdge CD (Creative Labs)

Circle reader service number 409

Fusion DoubleCD-16 (Media Vision)

Circle reader service number 410

Other Finalists

UltraSound (Advanced Gravis)

Circle reader service number 415

Pro 16 Multimedia System (Media Vision)

Circle reader service number 414

MultiSpin 74-1 CD-ROM (NEC Technologies)

Circle reader service number 412

Pioneer 4x Speed Multiple CD Changer (Pioneer)

Circle reader service number 413

Hello! Music (Yamaha)

Circle reader service number 411

YST-M10 Speakers (Yamaha)

Circle reader service number 416

Video Hardware

Video Toaster 4000

NewTek's original Video Toaster helped bring professional desktop video to the masses. The new Video Toaster 4000 literally brings Hollywood special-effects capabilities to the desktop.

The Video Toaster 4000 is a large expansion card that fits in a Commodore Amiga 4000 computer. The system can be run as a stand-alone or interfaced with your Windows or Mac system using NewTek's ToasterLink software. The board sports a 35-ns character generator, two broadcast-quality high-resolution 24-bit frame buffers, a four-input production video switcher, and a still store/frame grabber.

The Toaster's toolkit offers everything you'll need to create impressive—or, if you're not careful, garish—videos. The Digital Video Effects (DVE) generator can wrap video on objects, and flip, spin, tumble, or warp live video. Most impressive are the animated wipes, which let you use, for example, an animated golfer's swing to transition between two video sources.

But the biggest selling point of the Video Toaster 4000 is LightWave 3D 3.0, the incredible 3-D rendering program that's available only with the Toaster. Rather than trying to describe all its capabilities—such as haze, underwater effects, detailed texture mapping, and even lens-flares—I'll instead suggest you watch the TV programs "SeaQuest DSV" and "Babylon 5." Both shows use LightWave-generated special effects instead of traditional models.

For under $6,000 ($2,395 if you already have an Amiga system), you can own a special-effects system that's good enough for prime time. If the COMPUTE Choice Award isn't enough to convince you that this is the desktop video system of choice, consider this: In 1993 the Video Toaster won an Emmy Award for technical excellence.

DENNY ATKIN

Video Toaster 4000 (NewTek)

Circle reader service number 417

Other Finalists

MGA (Matrox Electronic Systems)

Circle reader service number 419

FlexScan (Nanao)

Circle reader service number 418

Printer

Hewlett-Packard LaserJet 4

Hewlett-Packard consistently offers great printers at incredible prices, and the LaserJet 4 is no exception. It's the best LaserJet ever, and it's the best value Hewlett-Packard has offered so far. With a suggested retail price of $1,759 (if you look around, you can find one for around $1,400), the LaserJet 4 weighs in at $200 less than the LaserJet III. For that price, the LaserJet 4 gives you four times the resolution, 37 more fonts, much improved print quality, and over twice the speed. If you need PostScript, you can have it for the $499 price of the PostScript Level II upgrade.

Just when you thought printers couldn't get any faster, Hewlett-Packard comes through again. The company's Printer Command Language 5 (PCL 5), the language used in LaserJet IIIs and 4s, is already faster than most other languages—especially the popular PostScript. But the addition of the TrueType font rasterizer and Windows TrueType fonts means that you don't have to wait for your computer to download fonts.

The LaserJet 4 comes with one of the fastest processors in the business: Intel's 20-MHz 80960 RISC processor. It also has increased data compression so less data has to be channeled. Hewlett-Packard's new Bi-Tronic bidirectional port transfers data at up to 156 kilobytes per second. The only thing that will hold back the LaserJet 4 is the speed of your computer. (A complete review of the Hewlett-Packard LaserJet 4 can be found in the August 1993 COMPUTE.)

WILLIAM HARREL

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Hewlett-Packard LaserJet 4
(Hewlett-Packard)
Circle reader service number 420

Other Finalists
Primera (Fargo Electronics)
Circle reader service number 423
Hewlett-Packard DeskJet 1200C
(Hewlett-Packard)
Circle reader service number 422
Hewlett-Packard LaserJet 4L
(Hewlett-Packard)
Circle reader service number 421

Peripheral

Smart One 1442FX

Best Data Products' Smart One 1442FX fax/data modem earns its COMPUTE Choice Award by packing superior performance at a bargain price. Based on the popular Rockwell modem chip set, the 1442FX provides 14,400-bps transfers in both fax and data modes. It supports all of the popular error correction and data compression modes, such as V.32bis and CCITT V.17 fax protocol. Connected to a similar modem, the 1442FX can manage transfers of up to 57,600 bps when transferring raw text with compression active. That's 192 times faster than a 300-bps modem.

The sturdy white plastic case is of the "sit under the phone" variety; it sports eight status lights on the front. At just under two pounds with power connector, it's light enough to pack along with your laptop (and it's much less expensive than battery-powered pocket modems of similar capability).

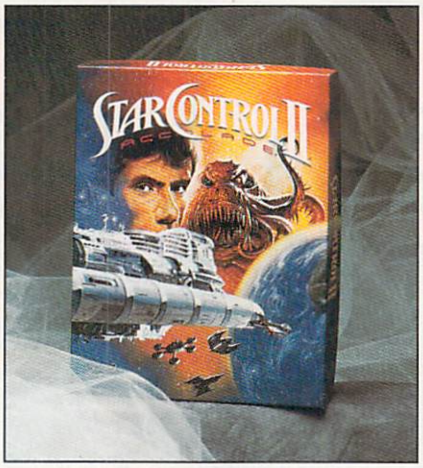
Although the modem retails for $319, it can be found for well under $200 at discount retailers. At that price, can you afford not to upgrade to 14,400-bps speed?
DENNY ATKIN

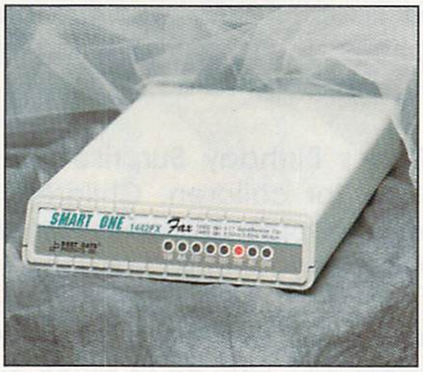
Smart One 1442FX
(Best Data Products)
Circle reader service number 424

Other Finalists
PCMCIA Modem with X Jack
(Megahertz)
Circle reader service number 426
MD-5024 CD-ROM Drive (Texel)
Circle reader service number 425

Arcade Game

Star Control II





Some games are like Tetris. In just a few minutes, you can learn the rules and know 80 percent of what you need to know in order to play. The rest is refining the rules and gaining the physical dexterity to carry them out.

Star Control II is an altogether different kind of game. With over 500 star systems and 3000 planets to explore and 18 alien races to converse with, this is no challenge-you-to-a-game-or-two-over-the-lunch-break kind of game. If you like intricately involved plots with rich details that have to be plotted on paper, this is the game for you.

It also helps if you enjoy science fiction. Star Control II is the best attempt, so far, at putting an epic science-fiction novel onto disk. No other program conveys as well the complexity of space travel and the variety of life forms we're likely to encounter when we begin to venture beyond the confines of our own neighborhood.

How does it play as a game? Despite the complexity—or perhaps because of it—you're drawn into the narrative. The graphics and sound are greatly improved over those in the original 1990 version. The arcade elements are well integrated and very playable. The bonus game, Super Melee, adds to the combat side of the scenario of aliens as either friends or foes.

This year, an honorable mention goes to Novalogic's Comanche Maximum Overkill, which features some of the most realistic polygon graphics this side of Hollywood. (Comanche Maximum Overkill is discussed in "Going Vertical" in COMPUTE, June 1993.)
DAVID ENGLISH

Star Control II (Accolade)
Circle reader service number 427

Other Finalists
Prince of Persia 2
(Brøderbund Software)
Circle reader service number 432
The Lost Vikings
(Interplay Productions)
Circle reader service number 433
Microsoft Arcade Pack (Microsoft)
Circle reader service number 431
Comanche Maximum Overkill
(Novalogic)
Circle reader service number 429
Lemmings 2: The Tribes (Psygnosis)
Circle reader service number 430
Flashback (Strategic Simulations)
Circle reader service number 428

Simulation

Microsoft Flight Simulator 5.0

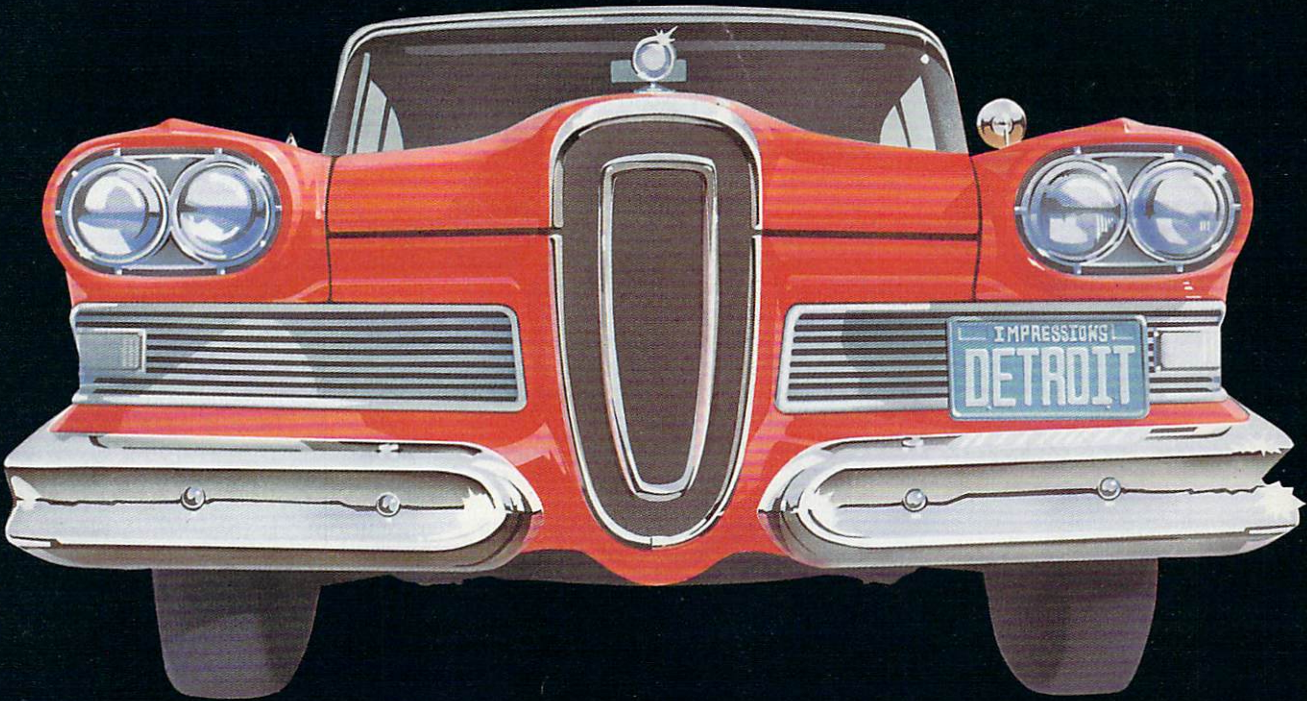
Chances are that you've seen or played Microsoft Flight Simulator. It has long been one of the most popular entertainment programs for the PC. But this is a new dawn for flight simulators. Version 5.0 takes the realistic flight characteristics of earlier releases and adds photorealist Super VGA scenery.

The game now runs in either 320 × 400 or 640 × 480, 256-color modes. The graphics are nothing short of spectacular—glancing at the instrument panel, you'd swear that you were looking at live video from inside a Cessna. Things look much better outside the plane as well, with smooth, Gouraud-shaded aircraft and incredibly detailed scenery. This version actually wraps digitized pictures onto the scenery—taking off from Chicago's Meigs field is one of the most realistic experiences you'll encounter on today's PCs.

Sound has been improved as well, with digitized sound support for popular 8- and 16-bit sound cards. Even the skies have been upgraded, with beautiful orange gradient sunsets and clouds that gradually flicker into existence as you fly into them.

This isn't a shoot-'em-up game—most of the fun here is in really learning how to fly a plane and in simply flying around and looking at the pretty scenery. And there's plenty to choose

DETROIT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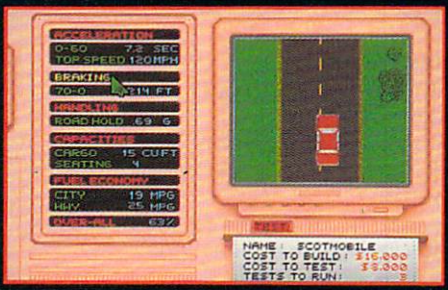
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BRAKING
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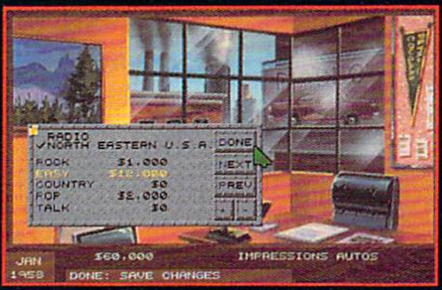
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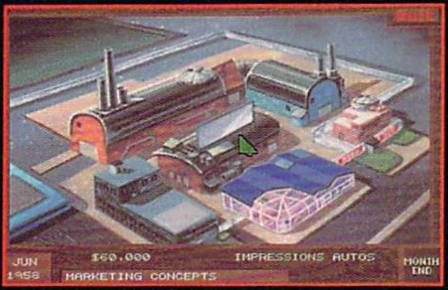
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Circle Reader Service Number 183

IBM PC VGA Screenshots

from, with New York and Paris scenery disks from Microsoft and many others coming soon from Mallard. So take off, eh?
DENNY ATKIN

Microsoft Flight Simulator 5.0 (Microsoft)
Circle reader service number 434

Other Finalists
Aces over Europe (Dynamix)
Circle reader service number 435
Car and Driver (Electronic Arts)
Circle reader service number 437
Buzz Aldrin's Race into Space (Interplay Productions)
Circle reader service number 436
X-Wing (LucasArts Games)
Circle reader service number 443
El Fish (Maxis Software)
Circle reader service number 438
SimCity 2000 (Maxis Software)
Circle reader service number 441
Empire Deluxe (New World Computing)
Circle reader service number 439
Rules of Engagement 2 (Omnitrend)
Circle reader service number 440
Strike Commander (Origin)
Circle reader service number 442

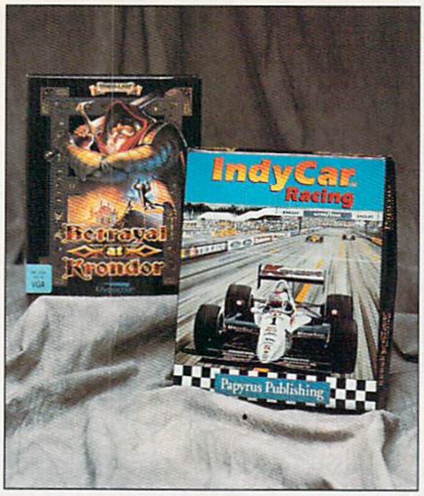
Fantasy Role-playing/Adventure Game

Betrayal at Krondor

A captivating story line, fantastic graphics, and special effects make Betrayal at Krondor, Dynamix's first attempt at fantasy role-playing, tower above the genre. Based on Raymond E. Feist's Riftwar series, the game picks up where Feist's latest book, *Darkness at Sethanon,* ends. It uses many of the recurring characters and locations from the series, so those familiar with the series will immediately fall into the action.

This complex, character-rich story unfolds as a series of nine individual chapters, the plot advancing only upon completion of specific goals in each one. These miniquests vary in size, difficulty, and clarity of mission. Segmenting the story this way gives great range to the gameplay—it's as if you're getting nine adventures in one.

Unlike in traditional role-playing games, you inherit full-bodied characters with unique personalities, rich pasts, and hopefully, prosperous futures. Rather than control every fiber of their beings, you merely make decisions—their overall strength of character determines whether the results of their actions will be positive.



Those unacquainted with Feist's complex fantasy world will have trouble following the flood of characters, race names, and locations. The manual helps, but Feist's prose is so thick with atmosphere and imagination that jumping headfirst into the fray can be overwhelming. Once you understand the background, you can really appreciate this game. Fired by literary passion and uncommon intelligence, Betrayal at Krondor approaches a new level of realism and enjoyment for computer fantasy role-playing games. (See this month's "Entertainment Choice" for a full review of Betrayal at Krondor.)

LucasArts' magnificent Day of the Tentacle, a B-movie science-fiction parody that skirts the lunatic fringe of comedy adventure, received an honorable mention in this category. (Look for a full review of Day of the Tentacle in this issue of COMPUTE.)
SCOTT A. MAY

Betrayal at Krondor (Dynamix)
Circle reader service number 444

Other Finalists
Syndicate (Electronic Arts)
Circle reader service number 452
Alone in the Dark (Interplay Productions)
Circle reader service number 445
Eric the Unready (Legend Entertainment)
Circle reader service number 447
Day of the Tentacle (LucasArts Games)
Circle reader service number 446
Might and Magic: Darkside of Xeen (New World Computing)
Circle reader service number 451
Inca (Sierra On-Line)
Circle reader service number 449
King's Quest VI: Heir Today, Gone Tomorrow (Sierra On-Line)
Circle reader service number 450
Fables & Fiends: Legend of Kyrandia, Book I (Virgin Games)
Circle reader service number 448
The 7th Guest (Virgin Games)
Circle reader service number 453

Sports Game

IndyCar Racing

The smell of tires burning—that's all that's missing from IndyCar Racing. The texture-mapped graphics in this driving game are incredibly realistic, down to the decals on the cars and the skid marks on the curves.

You race on the streets of the Long Beach Gran Prix, the oval at Michigan International Speedway, and a number of other tracks, against well-known race drivers. Rain, wind, and air temperature all affect car handling. If you want to get your hands greasy, you can custom-tune your own car in the dyno-equipped garage. Beginner features such as a visible groove which shows the best line through curves will get you started; then you can switch to full realism for a serious challenge. Once you perfect your skills, you can play a human opponent over a modem connection.

After the race is over (or after a spectacular crash complete with wisps of smoke), you can watch a video replay. This game has more replay options than "Wide World of Sports"—there are views from an overhead blimp, cameras around the track, the car's cockpit, and even the front wheel of the car.

With smooth gameplay, realistic graphics, great sound, and incredible attention to detail, IndyCar Racing captures the checkered flag with ease.
DENNY ATKIN

IndyCar Racing (Papyrus Publishing)
Circle reader service number 454

Other Finalists
Links Banff Springs Course (Access Software)
Circle reader service number 457
Front Page Sports Football Deluxe (Dynamix)
Circle reader service number 455
Jordan in Flight (Electronic Arts)
Circle reader service number 456
World Circuit (MicroProse)
Circle reader service number 460
Microsoft Golf—Multimedia Version (Microsoft)
Circle reader service number 458
Tony La Russa Baseball II (Strategic Simulations)
Circle reader service number 459

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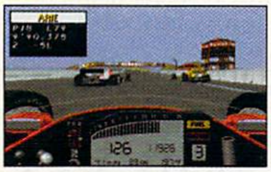

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The one and only PC simulation officially licensed by IndyCar. Now you can challenge the world's leading racers wheel to wheel. Plus, ***see*** *the actual drivers, their teams and cars in lifelike detail.*

RIGHT FRONT
COMPOUND
PRESSURE
CHANGE TIRE
DONE
SOFT
26 PSI

Complete Car Setup, Infinite Control

You call the shots - front and rear wing adjustments, brake bias, anti-roll, turbo boost, gearing, camber, stagger shocks, tire pressure and compound. Choose from 6 different engines and 5 different chassis for the ultimate race machine.

BOSCH BOSCH
168
6

Accurate Tracks

Experience the IndyCar season as the real drivers do. Every turn, bank, straight and hill is painstakingly accurate. Race the short ovals, super speedways, road courses and city street circuits. This is ***the*** *IndyCar simulation!*

REPLAY
TV
16 - Stefan Johansson

Overall Game Play

Feel the pressure. Make the same critical decisions the IndyCar teams make every race. Tune your car to the real track, qualify on the pole, develop your pit strategy, fine tune your race plans and more!

IndyCar Racing
Papyrus Publishing

Circle Reader Service Number 133

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PUBLISHING, INC.

Installment One of the
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Early Childhood

Arthur's Teacher Trouble

Arthur's Teacher Trouble brings Marc Brown's children's book to the computer screen with musical accompaniment, interesting animated effects, and a voice to tell the story.

Although the product is aimed at readers aged 6 to 10, you can have the story read. In that case you see the text from Brown's story highlighted onscreen as it's read in Arthur's voice. Children can read along, recognize the words, and follow the animated action as Arthur and his friends struggle through Mr. Ratburn's third-grade class and prepare for the school's big September Spell-a-thon.

All this happens when you choose to play inside the story. Doing so takes you to an interactive mode which brings the elements onscreen to life when you click on them. Each screen is a page out of Brown's book, and the animated illustrations fairly duplicate those in the small bound copy included with the software.

At every turn, the reader gets introduced to subtle humor and imaginative activities that will delight children and charm adults. Arthur teaches as it entertains and lets children become players in the storybooks they read.

The innovation and kid-oriented fun of Snap Dragon from MECC earned it an honorable mention in this category.

CAROL ELLISON

Arthur's Teacher Trouble
(Brøderbund Software)
Circle reader service number 461

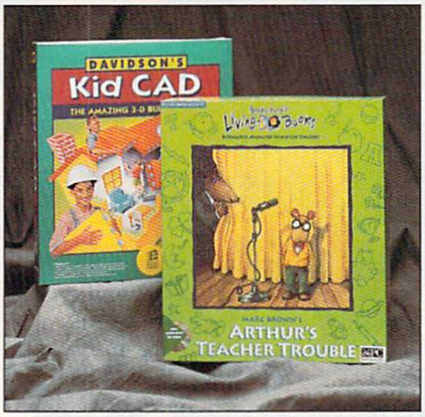
Other Finalists

Just Grandma and Me
(Brøderbund Software)
Circle reader service number 465
Kid Pix (Brøderbund Software)
Circle reader service number 466
Bailey's Book House (Edmark)
Circle reader service number 462
Millie's Math House (Edmark)
Circle reader service number 467
Scooter Magic Castle (Electronic Arts)
Circle reader service number 469
Fatty Bear's Birthday Surprise
(Humongous Entertainment)
Circle reader service number 463
Putt Putt Joins the Parade
(Humongous Entertainment)
Circle reader service number 468
Snap Dragon (MECC)
Circle reader service number 470
Follow the Reader (Walt Disney
Computer Software)
Circle reader service number 464

Kids

Kid CAD

Few programs captured the editors' imaginations more immediately than Kid CAD. When Davidson representatives came to demonstrate it for us shortly before its release, we all enthusiastically anticipated playing with it. Kid CAD is basically a computer-aided design program for creating houses and other structures using predesigned building materials. It features three environments: the city, the town, and the farm. You can build with various materials and use many different kinds of roofs. The program includes furniture for inside the home (yes, even bathroom fixtures). Have a ball creating a house that looks just like yours or put your creativity to work to design a house shaped like a swan or the number 2. You can also turn your imagination loose on the environment with landscaping tools that allow you to place shrubs and trees. Pets and people complete the scene.



The best part of Kid CAD (and the thing that makes it so immediately engaging) is that it represents your structures in three dimensions. You can move your perspective on your project, so you can see it from all sides.

And, after you've built your structure, what could be more fun that blasting it to smithereens? You can destroy your meticulously created edifice with bombs, laser beams, a lawn mower, or a bulldozer (save it to disk first, though, so you can blow it up again later).

We couldn't let The Animals! go by without an honorable mention. It's like a multimedia encyclopedia of the living world.

ROBERT BIXBY

Kid CAD (Davidson and Associates)
Circle reader service number 471

Other Finalists

Rock & Bach Studio (Binary Zoo)
Circle reader service number 480
Wild Science Arcade (Binary Zoo)
Circle reader service number 489
Island of Dr. Brain
(Bright Star Technology)
Circle reader service number 475
Lost Secret of the Rainforest
(Bright Star Technology)
Circle reader service number 477
Pepper's Adventures in Time
(Bright Star Technology)
Circle reader service number 479
Turbo Science
(Bright Star Technology)
Circle reader service number 487
Where in Space Is Carmen Sandiego?
(Brøderbund Software)
Circle reader service number 488
The Incredible Machine (Dynamix)
Circle reader service number 483
Eagle Eye Mysteries (Electronic Arts)
Circle reader service number 473
Science Adventure II
(Knowledge Adventure)
Circle reader service number 472
Time Riders in American History
(The Learning Company)
Circle reader service number 485
Treasure Cove
(The Learning Company)
Circle reader service number 486
My Own Stories (MECC)
Circle reader service number 478
Storybook Weaver (MECC)
Circle reader service number 481
European Racers 1.0
(Revell-Monogram)
Circle reader service number 474
The Animals!
(The Software Toolworks)
Circle reader service number 484
Stunt Island
(Walt Disney Computer Software)
Circle reader service number 482

SPEAK UP!

Is there a feature topic you'd like to see covered in COMPUTE? Let us know by calling **(900) 285-5239,** (sponsored by Pure Entertainment, P.O. Box 186, Hollywood, California 90078). The call will cost 95 cents per minute, you must be 18 or older, and you must use a touch-tone phone.

Reference

Microsoft Encarta Multimedia Encyclopedia

Quite simply, Microsoft Encarta Multimedia Encyclopedia is one of the best multimedia applications we've seen. While the 25,000 articles that Microsoft has taken from *Funk & Wagnalls Encyclopedia* may not be as strong as the 33,000 articles contained in The New Grolier Multimedia Encyclopedia, Microsoft has added so much additional information and organized the material so well that Encarta is easily the most browsable and usable of all the multimedia encyclopedias. Fully half the CD-ROM is made up of images and audio, with another 10 percent devoted to animations and videos.

Encarta improves on the multiple-path approach found in the other CD-ROM encyclopedias by offering a more logical structure. The overriding structure for Encarta is its 93 categories and 84 subcategories. Once in a subcategory, it's easy to view a full list of all the entries in that subcategory, browse each entry in alphabetical order, or switch to a new category or subcategory. By stressing a categorical organization, Microsoft has recognized how we learn best: by exploring a group of associated ideas and then jumping to a related group of associated ideas.

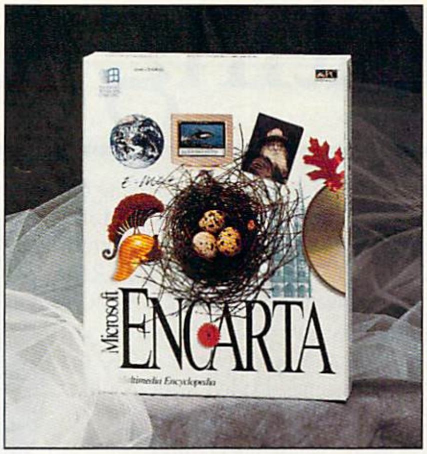
We could go on and on about the gems of wisdom you'll discover as you explore the recesses of Encarta. Suffice it to say that if you're the type of person who can spend hours in a library moving from one reference book to another, this is the one product that will make it worth your while to buy a CD-ROM drive and sound card. It's that good. (See the September 1993 issue of COMPUTE for a full review of Encarta.)

DAVID ENGLISH

Microsoft Encarta Multimedia
Encyclopedia (Microsoft)
Circle reader service number 490

Other Finalists

Compton's Interactive Encyclopedia
(Compton's NewMedia)
Circle reader service number 492
Global Explorer 1.0
(DeLorme Mapping)
Circle reader service number 496
EZCosmos for Windows
(Future Trends Software)
Circle reader service number 495
The New Grolier Multimedia Encyclopedia (Grolier Electronic Publishing)
Circle reader service number 497
Information U.S.A. (INFOBUSINESS)
Circle reader service number 498



Undersea Adventure
(Knowledge Adventure)
Circle reader service number 502
Microsoft Dinosaurs for Windows
(Microsoft)
Circle reader service number 499
Musical Instruments for Windows
(Microsoft)
Circle reader service number 501
COMPUTERWORKS
(Software Marketing)
Circle reader service number 493
Body Illustrated: The Anatomical
Guide (Spirit of Discovery)
Circle reader service number 491
Distant Suns 2.0 for Windows
(Virtual Reality Laboratories)
Circle reader service number 494
VistaPro 3.0
(Virtual Reality Laboratories)
Circle reader service number 503

Special Technology Award

Dual-Scan Passive Matrix Displays

If you've felt torn between stunning-but-expensive active matrix notebook displays on the one hand and less-expensive-but-harder-to-look-at monochrome or passive matrix displays on the other hand, take heart. Now you have another option—dual-scan passive matrix displays. With greater contrast and superior brightness, dual-scan displays look much better than conventional passive matrix displays, yet they use less power and cost considerably less than active matrix displays.

Part of the dual-scan performance boost comes from the screen itself. While active matrix displays use a transistor for each pixel and conventional passive matrix displays use a transistor for every eight pixels, dual-scan displays use a transistor for every three pixels. Dual-scan performance depends also on the video chip. In the Gateway Colorbook, a Cirrus Logic 6235 16-bit local-bus chip can take credit for impressive dual-scan performance.

Viewed from an angle, a dual-scan color screen still isn't as clear and easy to look at as an active matrix screen, but if you viewed a dual-scan screen straight on, you might like it even better than some active matrix screens.

In addition to Gateway, Toshiba is already using dual-scan screens, in its Satellite T1950CS. And as other companies inevitably adopt this impressive, cost-effective technology, who knows? Monochrome notebook displays may . . . fade away entirely.

From the standpoints of both cost and performance, dual-scan passive matrix technology is bound to appeal to COMPUTE's readers. Hence, we have selected it as the best technological advance of the year.

MIKE HUDNALL

Other Finalists

Cyrix Cx486DRX^2
EPA Energy Standard
IBM Continuous Speech Server
Microsoft at Work
Multimedia PC Level 2 Specification
Newton
OLE 2.0
PCI
Pentium
PowerPC
Zoomer

Winner's Circle

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Quattro Pro for Windows 5.0—$99.95
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"BUILT-IN POINTING DEVICES *vary in comfort and ease of use from the Apple PowerBook's large, front-mounted device to many smaller and less useful ones.* **IBM's TrackPoint II** *and* **Micro Electronics'** *small, front-mounted trackball were* **the best."**

PC Magazine, Cover Story, Portable PCs, August, 1993

Presenting an amazing deal on the IBM PS/Note™. We've teamed the quality and reliability from IBM® with added features and a price breakthrough that only Micro Electronics™ can deliver.

Small and lightweight, the PS/Note operates with the Intel 486 SL processor and has the power to run demanding business software. A larger, 170MB hard drive, 4MB RAM, included fax modem and added PCMCIA capabilities give you the features you want—all at a special price. Plus, the PS/Note comes loaded with popular software and bundled extras!

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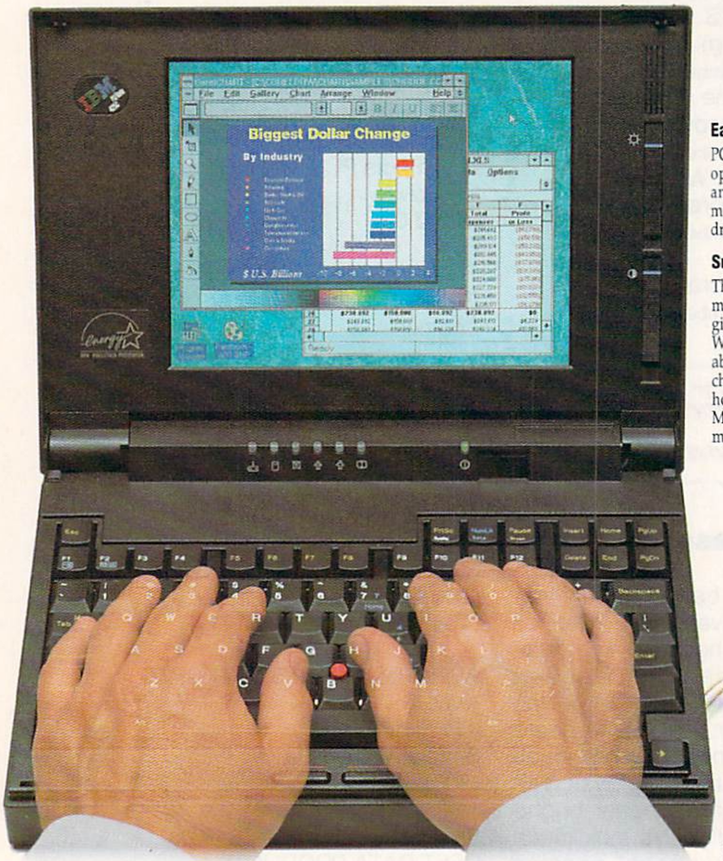


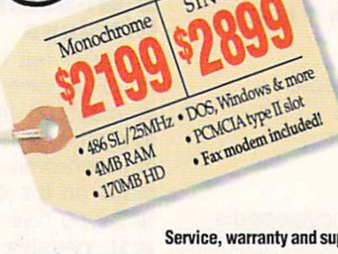
Exclusive Micro Electronics Features

Easy add-ons with PCMCIA

PCMCIA capabilities give you options for future expansion and technology. Additional memory, adapters, and hard drives are easy to install.

Superior battery life!

The advanced power management hardware and software give you a longer battery life. With power management enabled, you can run the monochrome PS/Note for up to five hours with the NiMH 2200 MA batteries. And there's no memory effect.



Your satisfaction is unconditionally guaranteed for 30 days from date of purchase. If for any reason whatsoever you are not satisfied with your purchase from us, we want you to return it.

The IBM PS/Note

A larger 170MB hard drive and built-in fax modem included! Plus:

- an Intel 486 SL/25MHz processor.
- 4MB RAM (expandable up to 20MB RAM).
- 8k internal cache
- a built-in 1.44MB 3.5" floppy drive.
- and a personalized nameplate.

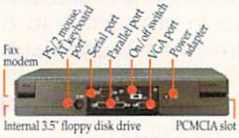
Receive free, preloaded software with your PS/Note –worth hundreds of dollars!

- MS-DOS 6.0.
- Microsoft Windows 3.1.
- PRODIGY.
- America On-line, PS/1 edition.
- PS/1 Fitness Index and Tutorial.
- plus your choice of Quicken, WinFax Lite or Calendar Creator Plus.

A keyboard with full-size keys—familiar to the touch

The PS/Note features an exceptional, full-size 85-key keyboard with the unique TrackPoint II pointing device. Control cursor movements with ease by moving and varying pressure on the eraser-like button.

Serial, parallel, VGA, and PS/2 keyboard/PS/2 mouse ports



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- One-year limited warranty with toll-free Express Maintenance.
- 30-day unconditional money back guarantee.
- On-line technical support for the life of the computer.

Convenient payment options

Use your MasterCard, VISA, Discover Card, personal check or P.O. with credit approval.

Thank-you for your order!

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Specifications

Size/Weight
- 11.7" X 8.3" X 1.9"
- Monochrome: 5.2 lbs. with battery
- Color: 5.8 lbs. with battery

Pointing Device
- TrackPoint II

Battery
- Monochrome: up to 5 hours with power management
- Color: up to 3 hours with power management
- NiMH (no memory effect)
- 2.2 AmpHours
- 110 AC Adapter
- Quick 1-hour recharge when not in use

Advanced Power Management
- Power management hardware and software (nearly transparent to user) for longer battery life
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- Intel 486 SL 25MHz CPU
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- 1024 x 768 for external monitor with 512k video RAM
- Monochrome: super-twisted 64 grayscale, 9.5" LCD
- Color: 256 colorscale 9.2" STN color
- Adjustable contrast and brightness

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- Full-function keyboard with 85 keys and 4 inverted-T cursor control keys

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- Fax-9600 baud send/4800 baud receive/2400 baud modem

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- Serial, enhanced parallel, VGA, PS/2 keyboard/PS/2 mouse
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Best Notebook Values.

> *"Scoring high in overall value and design, the Micro Electronic's WinBook gives you a lot for your money, including an outstanding integral trackball."*
>
> *PC MAGAZINE*, Portable Computing Issue, August, 1993

The WinBook by Micro Electronics™ gives you the power to run Windows and a unique, ergonomic design to make it easier to use.

It features a built-in, centered trackball which allows you to control cursor movements effortlessly without having to lift a single finger off the keyboard. Full-size keys and a sloping hand rest let you work in total comfort.

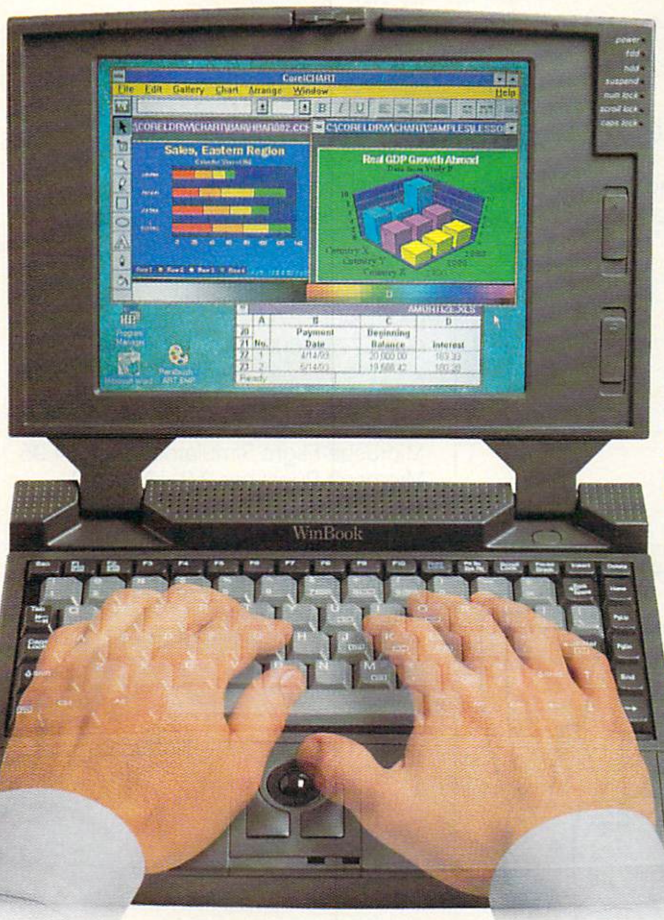
The new, upgradable, fully-static design SL enhanced Intel486SX 25MHz chip enables the CPU to operate at a 0MHz low power state. The WinBook's Pico Power Evergreen chipset integrates battery and power management with a proprietary, open loop heat regulator circuit to extend battery life and prevent heat build-up. Plus, we have fine-tuned the WinBook's screen. In monochrome and in dual-scan STN color—you get sharper, clearer images with less cursor loss.

The WinBook was engineered for Micro Electronics, a division of MEI/Micro Center, Inc. MEI is America's leading direct source for computer products. Micro Center has been selling PCs for more than 14 years—longer than IBM or Compaq—with over 736,000 units sold. With over 2.2 million satisfied customers nationwide, we have developed a superior support staff including top engineers and technical specialists. So you always get the highest quality product at the lowest possible price.

Dual-button trackball centered under the keyboard

WinBook™

COMPUTE CHOICE AWARD FINALIST



WinBook 486 SX Features

Ergonomically engineered

The WinBook's ergonomic features include a sloping hand rest and keyboard, plus a centered dual-button trackball—allowing you to work in total comfort away from your desk.

Clean, sharp color display

The WinBook's advanced, dual-scan color display gives you 99% shadow-free performance compared to other single-scan passive matrix displays. You get near active matrix quality at a passive matrix price!

NEW! Intel486 SX SL Enhanced

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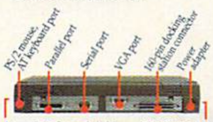
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Serial port
VGA port
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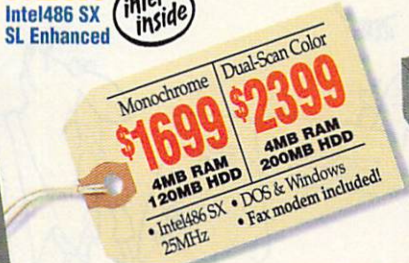
Power adapter
Internal 3.5" floppy disk drive
PCMCIA 2.0 slot

Docking station gives you desktop power

With the available docking station, your WinBook instantly becomes a full-function desktop computer. The two expansion slots and drive bays allow you to add peripherals such as monitors, hard drives, CD ROMs, I/O cards or an extended keyboard. It also includes parallel, serial, PS/2 mouse, external keyboard and VGA ports. **And it's just $399!**

Longer battery life

The WinBook features NiMH 2200 MA batteries with gold-plated contacts. This allows it to run much longer than units with traditional NiCAD batteries—and there's no memory effect.



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Thank you for your order!

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Specifications

Size/Weight
- 11" X 8 3/4" X 1 3/4"
- 5.4 lbs. with battery (monochrome)
- 5.9 lbs. with battery (dual-scan color)

Pointing Device
- 16mm Alps dual-action, Microsoft- compatible trackball

Battery
- Up to 3 hours with power management, over 5 hours with auxiliary battery (less 30 minutes for color)
- NiMH (no memory effect)
- 2200 MA with gold-plated contacts
- Worldwide auto-sensing AC adapter
- Quick 1.5-hour recharge

Processor and Memory
- SL enhanced Intel486 SX 25MHz CPU
- 4MB RAM
- Pico Power Evergreen HV chipset
- 8k internal cache

Drives
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- Monochrome: Internal 120MB (15ms) hard drive
- Color: Internal 200MB (16ms) hard drive

Software
- Comes loaded with MS-DOS 6.0 and Microsoft Windows 3.1

Display
- Super-twisted 64 gray-scale, 10" LCD and 1024 x 768 for external monitor with 512k video RAM
- Optional dual-scan STN color display
- Adjustable contrast and brightness
- Visible LED indicator on cover-down

Keyboard
- Full-function keyboard with 85 keys and 4 inverted-T cursor control keys, 3.0mm keyboard spacing

Modem
- Fax-9600 baud send/4800 baud receive/2400 baud modem

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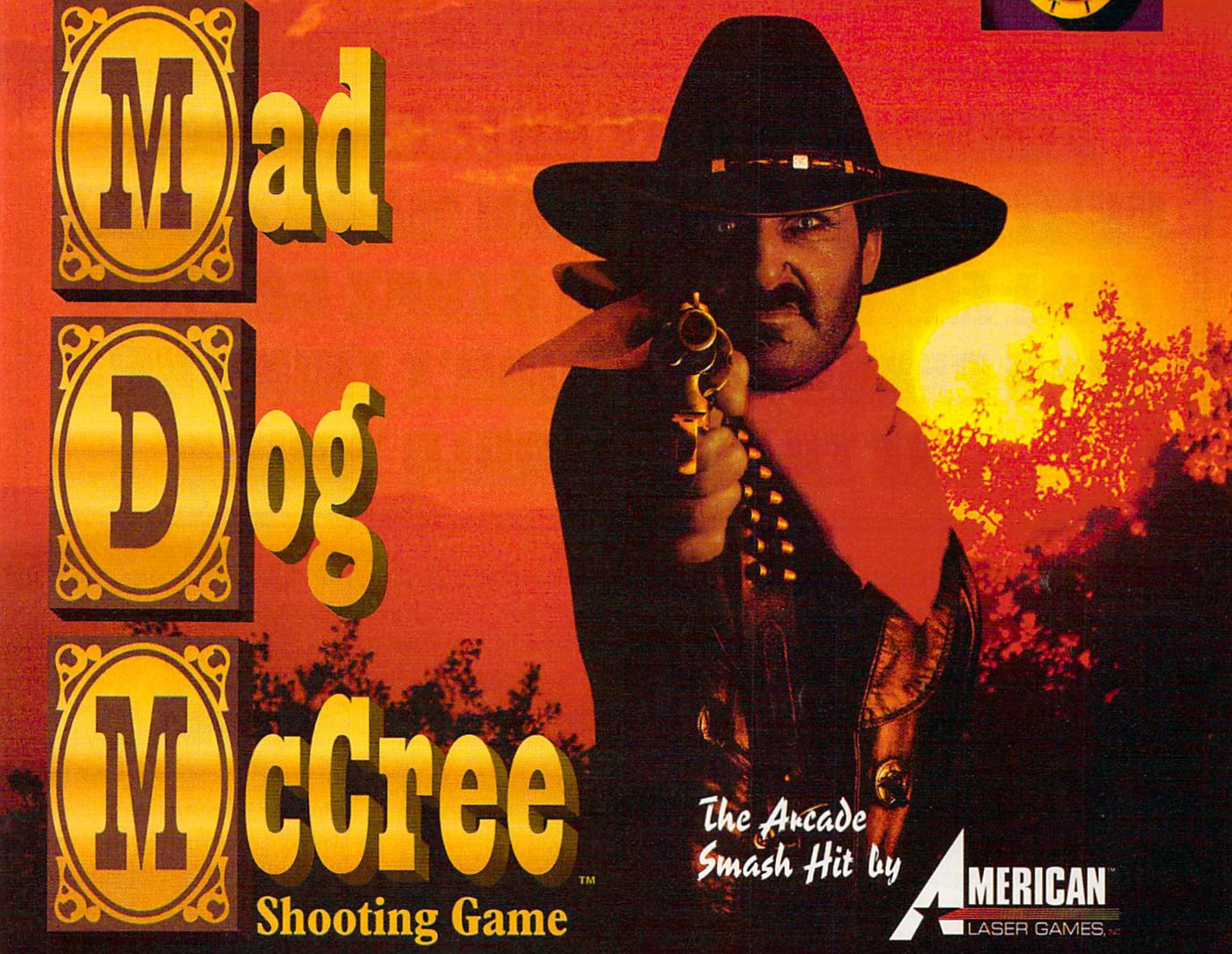
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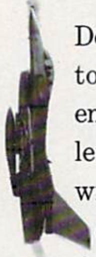

A TRUE STORY

Kuwait, May 23, 1991. Captain Dean "D-Dawg" Pennington dives to take out an Iraqi 85mm gun emplacement below. "Flares, break left!" his wingman screams. He wrenches the stick just as a SAM explodes 10 feet behind his F-16. Anti-aircraft batteries now open up all around, engulfing him. Too low to avoid the anti-aircraft, too slow to evade another SAM, he's faced with a hopeless choice and less than a quarter of a second to make it. Lighting afterburners, he rockets to safety before they can lock on again.

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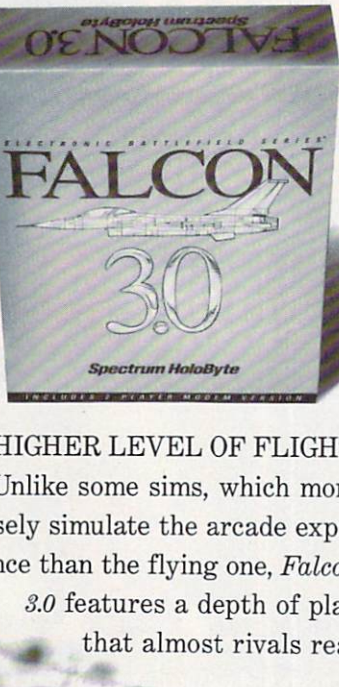
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ELECTRONIC BATTLEFIELD SERIES
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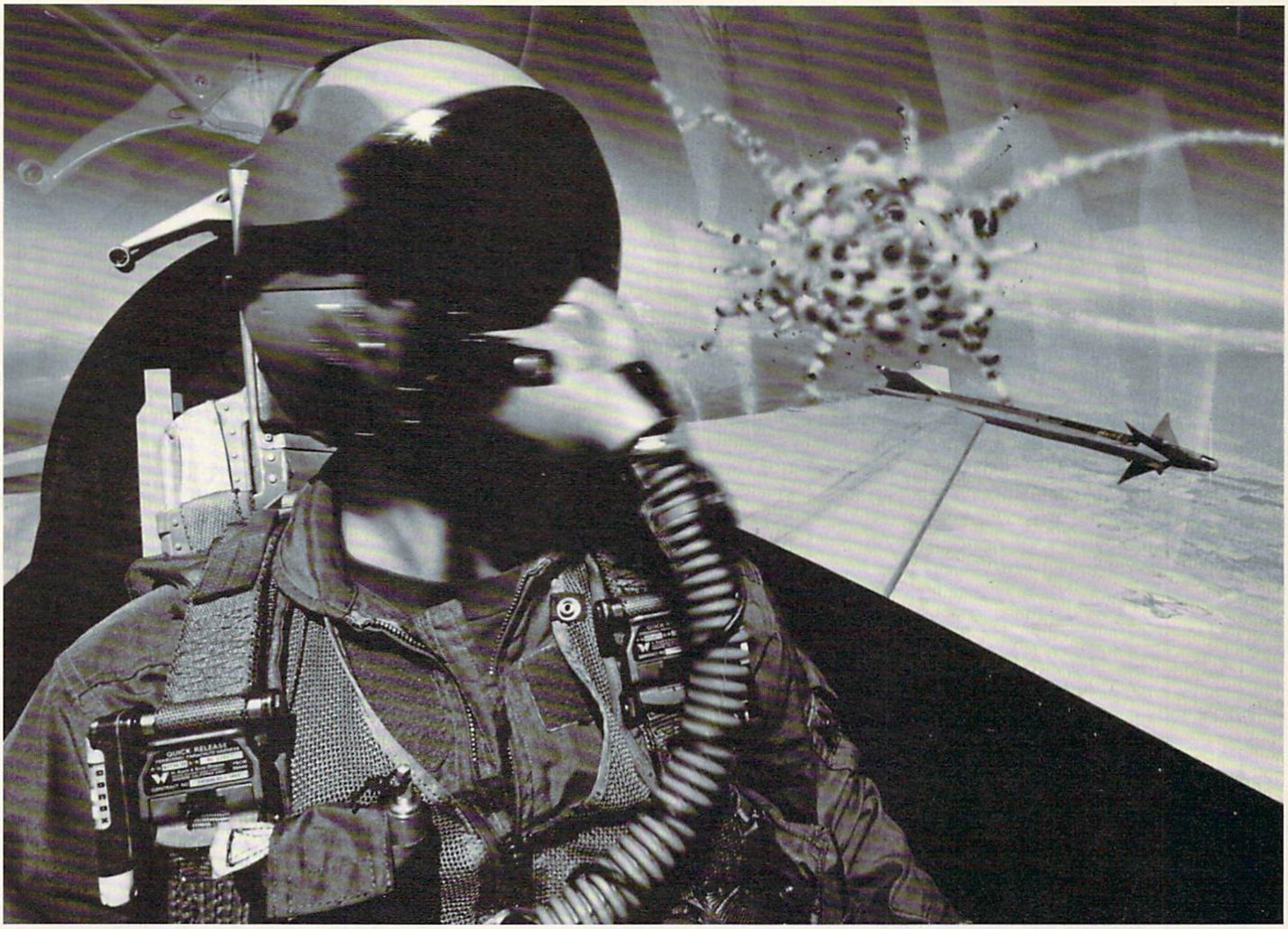

and go on to hit the enemy in his own backyard. Fail and find the bad guys breathing down your neck.

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MiG-29
VS.
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MiG-29
FALCON
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ELECTRONIC BATTLEFIELD SERIES

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Circle Reader Service Number 201

TEST LAB

Edited by Mike Hudnall
Reviews by William Harrel

Computer pundits have hailed 1993 as the year of the 600-dpi laser printer. While it's true that the high resolutions of these souped-up toner-spreaders do produce sharp graphics and halftones, if all you print is text and an occasional line-art image, don't let the hoopla obscure the reality of your needs. A 300-dpi printer will serve you just fine, thank you, and it will put much less stress on your pocketbook.

Unfortunately (or fortunately, depending on your politics), not all 300-dpi lasers are created equal. They differ widely in cost, speed, options, and yes, even print quality. This may indeed be the year of high-resolution printers, but it is also a great time to find terrific buys on 300-dpi models.

Choosing a laser printer a few years ago was much easier than it is today. Then, you had only two standards to pick from: a Hewlett-Packard LaserJet for Printer Command Language (PCL) compatibility or an Apple LaserWriter for PostScript. All the others in the printer market did their best to make comparable products, competing by offering more features at lower prices. Nowadays, good 300-dpi printers abound.

Another first for 1993 is that—if you shop around—you can buy a 300-dpi printer on the street for under $500. Printer prices, like those of everything else in the computer and peripherals arena, are continuing to plunge. But you usually get what you pay for. Often (but not always), the economy models are slow, print quality is lacking, and options are nil. A couple of hundred dollars can mean the difference between a printer that actually fits your needs and another fraught with frustration and limitations.

One criterion for this review is that the printer cost less than $1,000. Most of the machines reviewed here will suit most small-office needs. However, we did ask the manufacturers to equip the printers with at least 2MB of RAM, which is not included in the $1,000 limit.

Only the HP LaserJet 4L did not require a RAM upgrade. It ships with 1MB (most of the others ship with 512K) and the ability to compress data, which made the factory configuration more than sufficient for our tests. The Okidata OL400e ships with 512K, but it also compresses data. It completed all but our most memory-intensive test. After we added 1MB of RAM, bringing it up to 1.5MB, there was nothing we couldn't get it to do. Depending on the printer, the others require extra expense to equip them to print a full page of text and graphics.

> **"It is a great time to find terrific buys on 300-dpi models."**

Due primarily to font-handling options, printer languages were once a very important consideration in buying a printer. A few years ago, you needed a PostScript printer to take advantage of scalable outline font technology. Today's software solutions, such as Adobe Type Manager (ATM) and Windows' TrueType, have taken on much of the font-rendering burden. No longer is it necessary for a printer to support scalable fonts to print text at all weights and sizes from font outlines.

The printers reviewed here use Hewlett-Packard's PCL, the language found in LaserJets (the Texas Instruments printer provides both PCL and PostScript). However, some use PCL 4, the language found in HP Series II devices (IIP, IID, and so on). And others use PCL 5, the standard used in LaserJet IIIs and 4s.

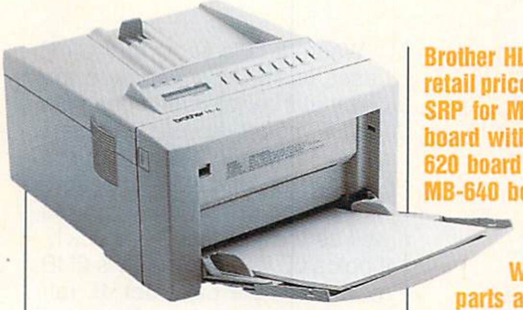
The differences between these two versions are significant. PCL 4, for example, does not support scalable fonts. To get different sizes, weights, and styles, you must send a separate font file to the printer for each one.

If you use Windows, font scaling is not a problem—it's built in. However, most DOS applications cannot scale fonts. Instead, you must keep a separate soft font file on your hard disk for each style, size, and weight you want to use. Doing so eats up valuable disk real estate and slows printing.

Another drawback of PCL 4 is limited print quality. PCL 4 does not, for example, print good halftone screens, and it cannot print reverse type (white type on a black background). The choice between a printer with PCL 4 and one with PCL 5 seems clear.

The only reason you really need PostScript is to print PostScript graphics (which are the formats used by many clip art packages) or to proof output intended for imagesetters (typesetting equipment), color-proofing printers, and slide recorders.

Printer engines are rated at pages per minute (ppm), such as 4, 6, 8, and 10 ppm. The most common printer engines are built by Canon. However, all the ppm rating really measures is how fast the engine churns sheets of paper through the machine, which says nothing about how quickly the printer's processor rasterizes them. Also important to printer



speed are the amount of RAM it contains and the speed of the processor. Most of the printers reviewed here have 16-MHz processors, which are quickly becoming the slowest in the industry today but are quite adequate for most desktop environments.

To test these printers, I first judged how easy they are to set up and use. I then ran a series of real-world tests, which included four documents: a 20-page Microsoft Word for Windows file, a 4-page Aldus PageMaker newsletter, a full-page CorelDRAW! drawing, and an Adobe Photoshop gray-scale photograph. The tests were designed to gauge speed and test print quality—which are, after all, the most important considerations when buying a printer.

The tests were performed with Windows Print Manager turned off so that my 486/33 would dump the print data directly to the printer. I began each timing when I clicked on OK and ended it when the final page reached the output tray. The accompanying graphs show you the results of these tests.

The results are interesting, as well as valuable if speed is a factor in your purchasing decision. In addition to these test results, this month's Test Lab includes reviews of each product, a table of features so that you can compare these printers head to head, and a sidebar with suggestions for buying a printer. Read on. Surely there's a printer here that can meet your needs.

WILLIAM HARREL

Brother HL-6T—$895 suggested retail price (SRP) for base unit, $149 SRP for MB-600 memory upgrade board with 0MB, $319 SRP for MB-620 board with 2MB, $699 SRP for MB-640 board with 4MB, no price as yet for PostScript options

Warranty: two years, parts and labor

BROTHER INTERNATIONAL
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BROTHER HL-6T

Brother International's entry in the economy printer market—the HL-6T—is one of the fastest printers reviewed. It turned in second- or third-place times on all four of my tests. Setting the printer up requires a minimum amount of fuss, and the documentation is clear; you'll be ready to go in no time. Simply slide the combination toner-developer cartridge into the front of the printer, and you're off and running.

The printer is light and relatively small, capable of fitting neatly on most desktops. Built around Canon's 6-ppm engine, the HL-6T resembles LaserMaster's WinPrinter, which is a popular high-resolution printer. One thing I don't like about the HL-6T's design is that the input and output trays extend from the front of the machine, causing them to take up about twice as much room as they should. Also, the front-mounted lid is a little flimsy. It's too easy to close it improperly, which could damage the printer.

Instead of PCL 5, the HL-6T uses PCL 4, emulating the LaserJet IIP; so it has some limitations, such as an inability to print reverse type. To get around this problem, you have to create graphics and import them into your documents—a hassle. However, print quality is good. The Photoshop halftone I printed on the HL-6T is one of the best. Text (though a bit heavier from this printer than from some of the other printers) is crisp and clean. Both small and large type print well. And the CorelDRAW! drawing, which contains a graduated fountain-fill background, looks good. There is minimal banding in the continuous light-to-dark background.

This printer ships with more resident fonts than the others (48), as well as 12 TrueType fonts for scalable output from Windows apps. I found installing the Windows printer driver and fonts a snap. The LED is clear and easy to see, and the front panel is easy to figure out. I made most selections without even cracking the manual.

The HL-6T supports up to 4.5MB of RAM, but the 2.5MB configuration I tested sailed through the tests. Brother has made installing the extra memory quite easy—all you do is loosen one screw, slide the lid back, and snap in a couple of SIMMs.

When the printer is used with the bundled Windows printer driver, a data compression routine makes for faster printing, and the printer requires less memory. But here's the real benefit of this technology: When you use the Windows Print Manager (Windows' built-in spooler), control of the computer returns more quickly. The driver also lets you switch the high-speed parallel interface on and off, download fonts (as either permanent or temporary), and adjust graphics print quality.

The HL-6T is also one of a few printers to support a bidirectional parallel port. This option keeps you apprised on your monitor of the printer's status and progress during a print job. It notifies you, for example, when the printer runs out of memory or needs paper.

Again, my only objections to this printer are that its trays take up a little too much space and the printer itself could be just a little sturdier. I also think that it should support PCL 5. Otherwise, the

HL-6T is a great value. *(Editor's note: Since the writing of this review, Brother has introduced the HL-6V, a 6-ppm, 300-dpi printer that does support PCL 5. Its suggested retail price is $995.)*

Circle Reader Service Number 243

CANON LBP-430

Canon's LBP-430 is almost identical to Hewlett-Packard's LaserJet 4L. The two printers look almost exactly alike, have the same Canon 4-ppm engine, and support PCL 5. The LBP-430 comes out of the box ready to print. All you do is pull the tab on the toner cartridge, slide in some paper, and let 'er rip. It's as simple as setting up the toaster for breakfast.

Where this printer really excels over the others in this month's Test Lab is in its setup utility and documentation. The setup utility, a Windows-based application that installs and configures the printer driver automatically, asks all the right questions and takes all the guesswork out of the installation. During the installation process, it displays graphics that acquaint you with the printer while you wait for files to copy and decompress. What could be easier? After installing the printer, you can use the setup utility as needed to control various options, such as printing a test page, changing the default font, and setting density.

The online documentation is the best I've seen. It has eight well-illustrated topics—Setup, Paper Handling, Software Issues, Adding Memory, and so on—that not only explain all concepts quite well but also demonstrate procedures with drawings and actual photographs of the printer. Each topic receives quite thorough coverage, and you can navigate the online book by using the table of contents menu or search terms, as you would with the Windows Help system. I tried and tried to think of issues not covered in the online material—without success.

Canon LBP-430—$799 SRP for base unit, $700–$1,000 for PostScript capability through Freedom of the Press software, pricing on 2MB and 5MB upgrade options available by calling vendor
Warranty: two years, parts and labor

CANON COMPUTER SYSTEMS
2995 Redhill Ave.
Costa Mesa, CA 92628
(800) 848-4123

If you're short on desk space, you'll appreciate the compactness and small footprint of this printer. Need to move your printer around? This one is light and easy to move. And it saves power, thanks to an automatic sleep mode that, after 15 minutes of inactivity, cuts power consumption down to a bare minimum.

The printer has its own built-in resolution enhancement technology, which Canon calls Automatic Image Refinement (AIF). AIF helps prevent jaggies in large text and the curved and diagonal lines in graphics. The one-button control panel is easy to figure out and use—the list of conveniences goes on and on. This is simply a nice printer.

Though middle-of-the-road in speed, the LBP-430 prints very well. Text is clear at both large and small sizes. Gray-scale halftones are as good as or better than those from any of the other printers reviewed here. I could find nothing to complain about.

Where it falls short of the HP LaserJet 4L, however, is in the way that it handles memory. With the HP model, I could complete all my tests with 1MB RAM; the LBP-430 required 2MB. Apparently, it doesn't compress data as well as the LaserJet 4L. Luckily, it holds up to 4MB, which is 2MB more than the LaserJet 4L (although that printer would probably never need more than 2MB to print anything).

For a number of reasons, this is a great printer, and you can buy it at a reasonable price.

Circle Reader Service Number 244

BEFORE YOU BUY

Never before have printer vendors offered so much for so little. Some of the printers in this review are just as good as or better than machines that cost twice as much or more a year or two ago. The device you should buy depends primarily, of course, on what you intend to do with it.

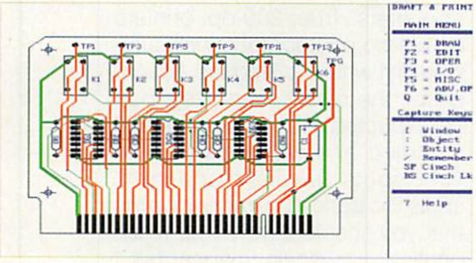
Most home office and small-business applications need an all-around, dependable machine that prints good-looking text and an occasional graphic at a reasonable speed. Most of the printers reviewed here fit that bill nicely. However, five of them stand out: Hewlett-Packard's LaserJet 4L, Canon's LBP-430, Epson's ActionLaser 1500, Okidata's OL400e, and Brother's HL-6T. All are good, durable printers; but since the HP, Epson, and Canon models support PCL 5, they're more attractive if you'll be printing text special effects (such as reverse type).

If you need a heavy-duty printer with lots of upgrade options, you should choose either the Lexmark or Star Micronics offering. Again, the Star Micronics LS-5EX's support for PCL 5 makes it a little more attractive. Finally, if you plan to do desktop publishing and will be printing EPS graphics or using your desktop laser as a proof printer, the Texas Instruments microWriter is a good choice. Some of the other printers offer PostScript, but none of them can give you PostScript and AppleTalk support for less than $1,000.

—WILLIAM HARREL

WHAT DO THESE PEOPLE HAVE IN COMMON?

Front View
Side View
Utility Room Cabi
Job# 5628
For: Mr. B. Kra
Cassie Cons
WINTERFIELD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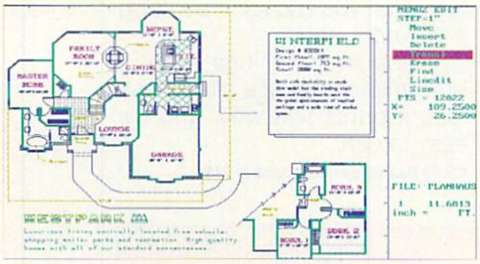
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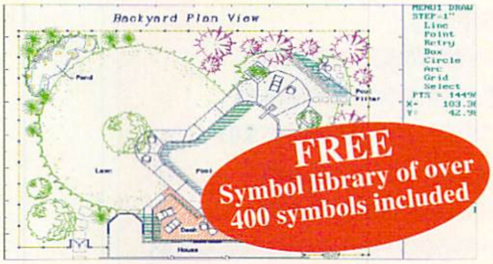
—Nicholas Spagnola York, PA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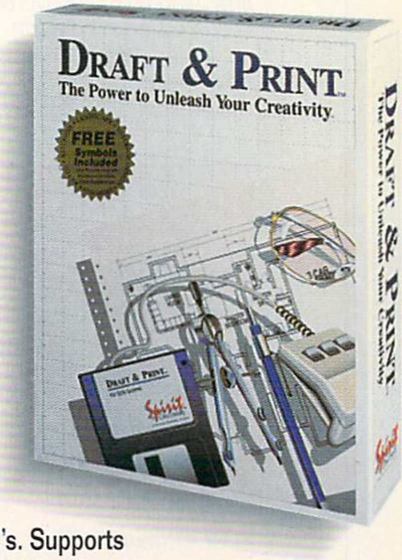
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EPSON ACTIONLASER 1500

Epson ActionLaser 1500—$600–$699 estimated street price (ESP) for base unit, $750–$850 ESP for review model with 3MB RAM
Warranty: two years, parts and labor

EPSON AMERICA
20770 Madronna Ave.
Torrance, CA 90503
(800) 922-8911

Epson's ActionLaser 1500 is a good printer with some limitations. Though lacking in a few of the frills found in the more recently released printers, such as Brother's HL-6T and HP's LaserJet 4L, it does support PCL 5. It doesn't come with its own printer driver with bidirectional port controls, but it's a little faster than most of the other printers reviewed here. It's easy to set up and use, and Epson has made it sturdy, light, and compact enough that it won't push you off your desk.

During setup, I encountered only one problem—installing the RAM upgrade. The printer's design forces you to remove too many screws and parts. Furthermore, rather than installing convenient SIMMs, you must press in memory chips, which, without practice, isn't foolproof. On the other hand, I found loading the toner-developer unit almost as easy as switching on the conveniently front-mounted power switch.

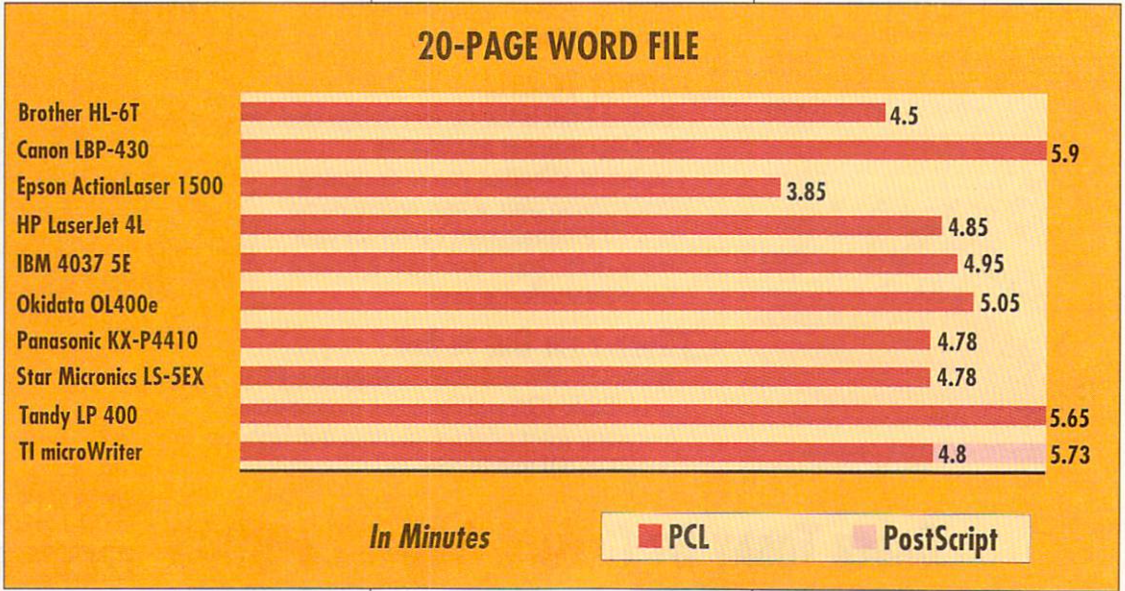
The real question is, of course, how well does it print? And again the ActionLaser has its pros and cons. Similar to HP's Resolution Enhancement technology (REt), Epson's built-in Resolution Improvement Technology (RIT) sharpens your output. RIT fills in the gaps around the edges of text and graphics so that the resolution seems higher than it really is.

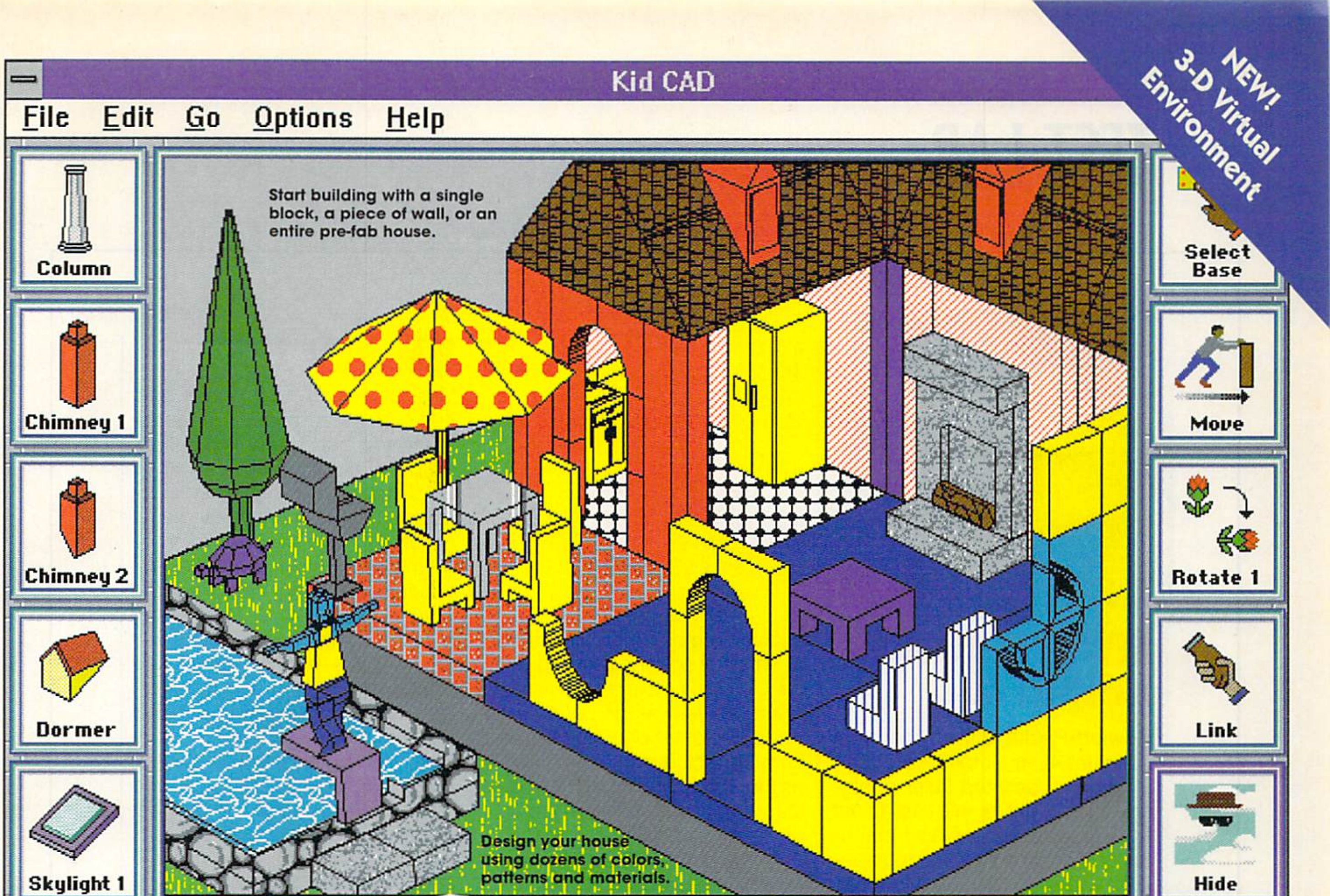
The ActionLaser prints text as well as or better than any of the other printers reviewed here. Look closely, and you'll find slender and straight strokes on small type. Curves are crisp. Even under a magnifying glass, the type doesn't exhibit any misplaced toner—not always the case with other printers. Large text really does look as though it's printed at a higher resolution than 300 dpi. Monotone graphics look great.

However, the ActionLaser cannot print gray-scale photographs nearly as well as some of the other printers. True, 300-dpi printers do not do photographs well, anyway. But when I tested the ActionLaser, the results were less than I'd expected. The photos looked muddied and washed out, with light spots too light and dark spots too dark. The manual warns that you should turn RIT off when printing gray-scale images, but I tried it both ways and saw little or no difference. If you plan to print many gray-scale screens or photographs, you shouldn't be using a 300-dpi laser.

These shortcomings aside, I liked this printer. It's sturdy and fast, it prints text well, and it's easy to use.

Circle Reader Service Number 245

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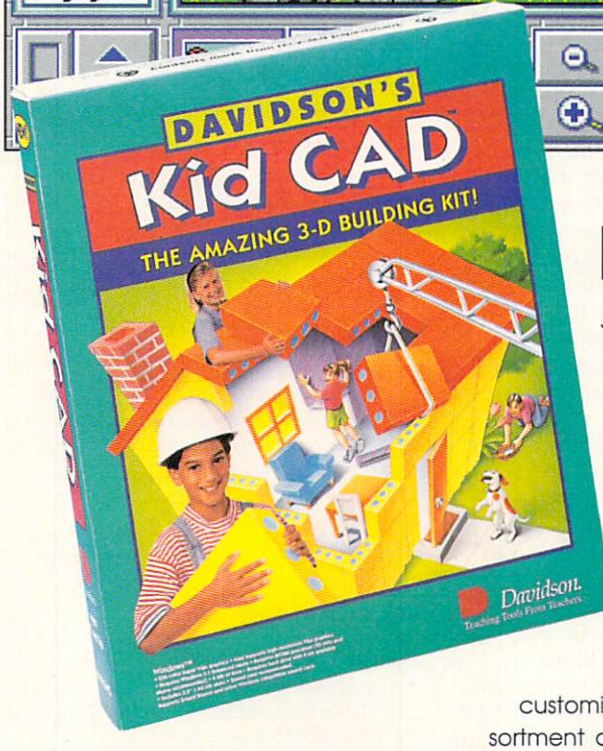
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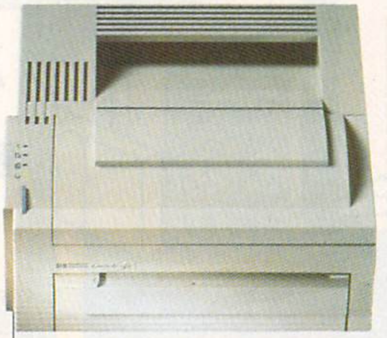

HEWLETT-PACKARD LASERJET 4L

Hewlett-Packard's economical LaserJet 4L is almost everything a personal desktop laser printer should be: light, small, easy to set up, and easy to use. The manufacturer provides great documentation as well as an online reference that helps with everything from setup to downloading fonts and using the printer with various software applications.

It's tough to find anything to criticize about this printer. All the features I like in the Brother HL-6T—the bidirectional parallel port, the easy font downloading, the graphics quality, the resolution control, and so on—are here, as are several other interesting and helpful options. About my only complaint is that this printer turned in slightly slower printing times than some of the others.

Of all the printers in this roundup, the LaserJet 4L is the only printer that ships in a standard configuration with enough memory to perform our tests. It has 1MB of RAM, which you can upgrade to 2MB. This doesn't sound like much, but HP's Memory Enhancement technology (MEt) compresses data, effectively doubling the capacity of the installed RAM. Hence, 1MB is like 2MB, and so on. Sound too good to be true? I tried, but I could not overload the memory in this printer.

HP's exclusive Resolution Enhancement technology (REt) works similarly to Epson's RIT. However, I found the LaserJet 4L's technology more satisfactory, whether printing text or graphics. Frankly, the LaserJet 4L prints as well as or better than any of the other printers reviewed here. In fact, it prints text as well as the 600-dpi Lexmark I use regularly, and its halftones (though obviously 300-dpi) are great.

Some other HP options also help to make this a standout printer. Intelligent On/Off turns the printer off after extended periods of idleness. EconoMode allows the printer to use 50 percent of the usual amount of toner when printing drafts, proofs, internal memos, or any other documents that don't require top quality. HP's toner cartridge comes with superfine toner, which also enhances print quality. And with HP's Reduce/Reuse/Recycle design, the manuals come on recycled paper, and you're encouraged to recycle the toner cartridges, on which HP pays the return postage.

Finally, unlike any of the other printers reviewed here, the LaserJet 4L contains the Enhanced PCL 5 found in the LaserJet 4, which provides a faster printing speed than that of the IIIP (which the LaserJet 4L replaces), and Intellifont scaling. Scaling allows you to use HP's Intellifont format to print at any point size (similar to PostScript Type 1 fonts). The LaserJet 4L has 26 resident Intellifont typefaces.

Again, this is a great printer at a great price. If you're looking to break into the laser printer world, this one opens the door painlessly and with style.

Circle Reader Service Number 246

Hewlett-Packard LaserJet 4L—$849 SRP for base unit, $99 SRP for 1MB RAM
Warranty: one year, parts and labor

HEWLETT-PACKARD
P.O. Box 58059
MS 511L-FJ
Santa Clara, CA 95051-8059
(800) 752-0900

IBM 4037 5E

Like the Epson laser printer, the 4037 5E is a mixture of good news and bad news. Immensely simple to set up, it comes with a DOS-based utility that checks to make sure you've set up the printer correctly and then installs printer drivers for most popular applications, including WordPerfect, Windows, and Word. This printer is fast, but in its native emulation—IBM's PPDS—print quality isn't up to par, and its HP LaserJet emulation isn't always adequate, either.

Lexmark makes installing a memory upgrade in this printer quite simple. Just open a door and slip in a SIMM. You'll find installing the font card and the flash memory option (which allows you to download permanent soft fonts) just as easy. Flash memory comes in both 0.25MB and 1MB modules. You can use it to

A NOTE ON PRICES

With hardware products changing more rapidly than ever and with options more plentiful than ever, prices can be a tricky business.

It pays to keep the following points in mind:

Street prices can be considerably lower than suggested retail prices. Although most manufacturers supply us with the suggested retail price, a few supply only the street price, and it's important that you pay attention to which pricing appears in the product information. Then you should shop around to find the best price.

Although we try hard to provide timely information, a product may have changed by the time our review sees print.

At COMPUTE, we make every effort to verify prices and differentiate between the price for a review configuration and the price for a base configuration. The first price you'll see in the product information is for a base configuration. It's a good idea to call the manufacturer or vendor to make sure that the configuration you want matches the price you have in mind.

—MIKE HUDNALL

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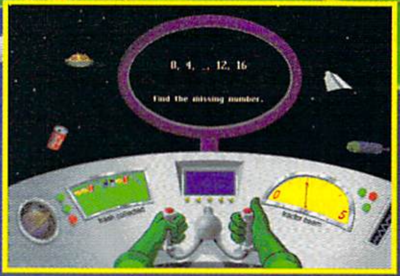
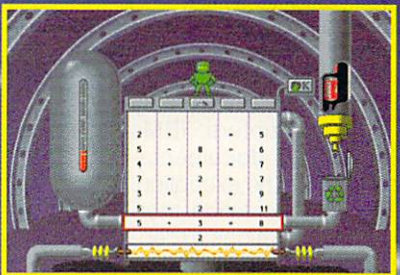
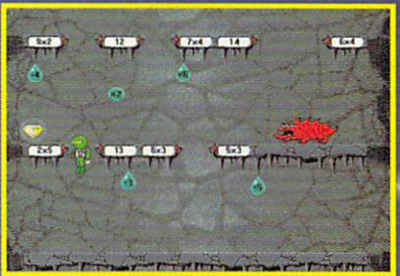


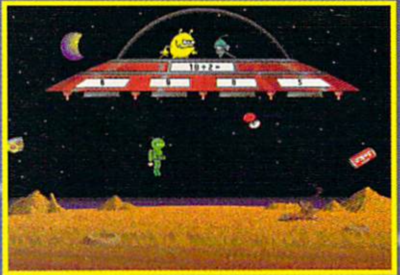
Oh no! The Trash Alien has captured Spot and left behind a trail of litter. In Trash Zapper, your mental math skills are needed to help clean up the mess.



The *Number Recycler* can convert trash into fuel but Blasternaut needs your problem-solving abilities to make it work. Recycle all the trash and you're ready to go!



You've tracked the Trash Alien to his home planet. But you haven't saved Spot yet! Use your mental math skills to help Blasternaut calculate his way through the *Cave Runner* game.



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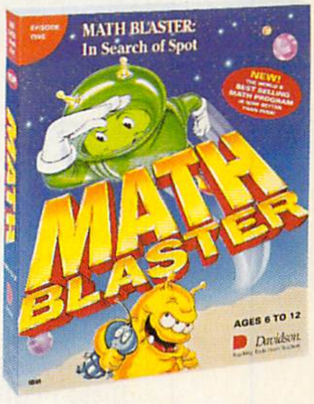

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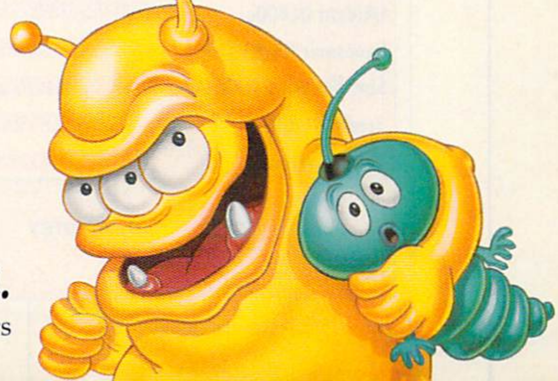

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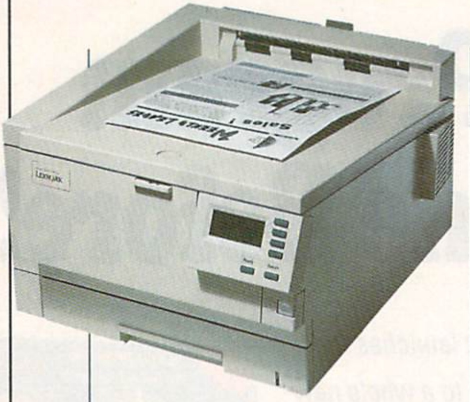


IBM 4037 5E—$799 SRP for base unit, $109 SRP for 1MB RAM, $189 SRP for 2MB RAM, $279 SRP for 4MB RAM
Warranty: one year, parts and labor

LEXMARK INTERNATIONAL
740 New Circle Rd.
Lexington, KY 40511
(800) 258-5835
(606) 232-2000

send fonts to the printer in advance of print jobs, which can save time when printing. However, the flash memory works only in PPDS mode, which means you don't benefit from it when using the printer in HP LaserJet emulation. The font card, which provides 23 scalable resident fonts, is a great option also, but it, too, works only in PPDS mode.

These PPDS options are great for printing text; however, this printer does not print halftone screens very well at all. In the CorelDRAW! test, the printer produced entirely too much banding (obvious abrupt transitions from one shade to another) no matter how I adjusted the print pattern and contrast. The CorelDRAW! drawing printed much better in PCL mode, but PCL 4 leaves something to be desired. The 4037 5E was not able to print some newsletter pages in PCL mode with 2.5MB RAM. It ran out of memory.

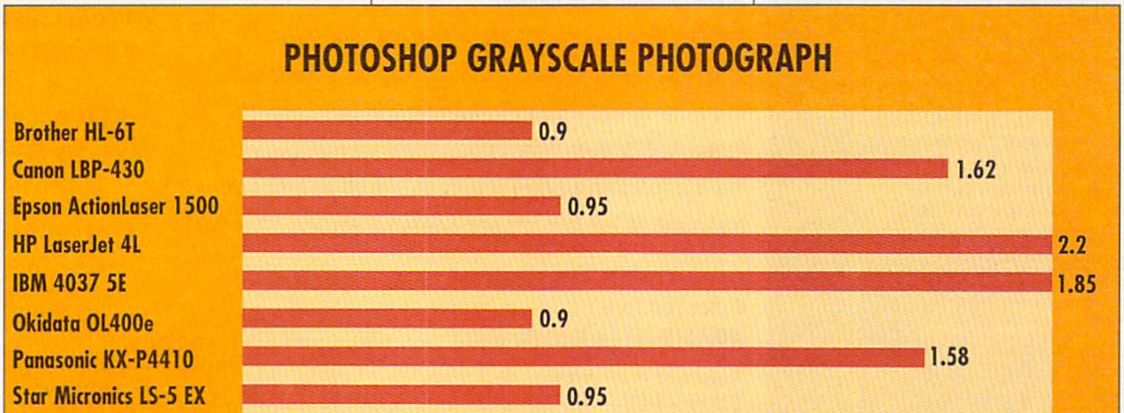
This printer does, however, have some attractive features. The LED is large, and the logically arranged buttons make changing emulation and other choices easy. The large paper tray has an indicator on the front that lets you know when you're getting short on paper. It does not, however, support legal-size pages. You'll have to buy an optional tray for that. I found text quality great at large and small sizes, in both PPDS and PCL modes.

SPEAK UP!

Is there a group of hardware or software products you'd like to see covered in an upcoming Test Lab? Let us know by calling **(900) 285-5239,** (sponsored by Pure Entertainment, P.O. Box 186, Hollywood, California 90078). The call will cost 95 cents per minute, you must be 18 or older, and you must use a touch-tone phone.

This is a big, sturdy printer capable of handling heavy-duty jobs. Like HP's printers, IBMs always have great documentation. The 4037 5E is no exception. I found the documentation thorough and the illustrations exceptional and helpful. And the online utility makes setting up, programming, and font downloading a snap. This printer is not as sophisticated as some of the others, and it has a few frustrating quirks; otherwise, it's a dependable machine worth considering.

Circle Reader Service Number 247



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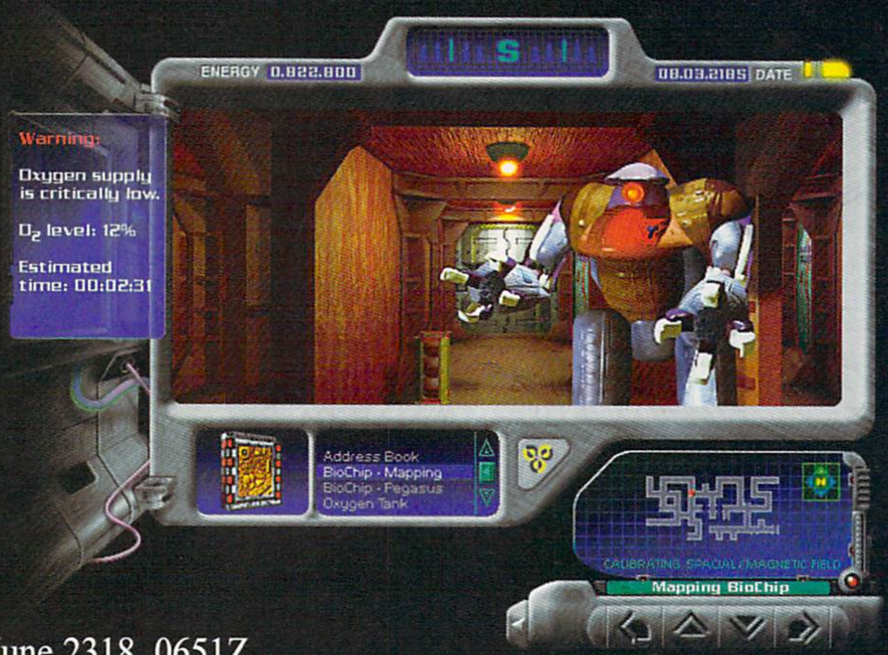
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Circle Reader Service Number 196

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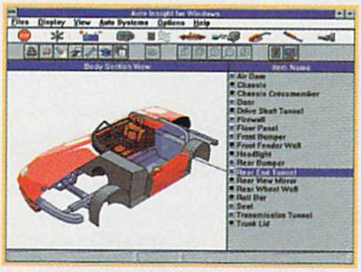
Auto Insight for Windows
Files
Display
View
Auto Systems
Options
Help
Body Section View
Item Name
Air Dam
Chassis
Chassis Crossmember
Door
Drive Shaft Tunnel
Firewall
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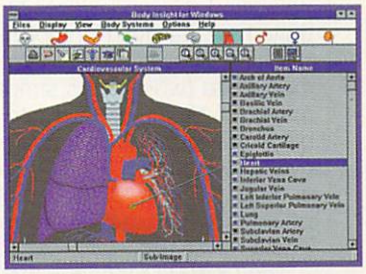
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Options
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Cardiovascular System
Item Name
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Bronchus
Carotid Artery
Cricoid Cartilage
Epiglottis
Heart
Hepatic Veins
Inferior Vena Cava
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Circle Reader Service Number 237

OKIDATA OL400E

If you need a fast printer that prints well and takes up an incredibly small portion of your desktop, you should take a good long look at this one. In fact, if your computer workspace is limited, this could be the printer for you. It has a lot of options squeezed into a small package, and I like it.

Like HP's LaserJet 4L, the OL400e compresses data, thus requiring less memory. It comes standard with 512K, and surprisingly, this is enough for most print jobs. Only while printing the most stringent of the newsletter pages did it peter out. Even then, it finished most of the pages, defaulting to Courier only at the bottom of the most complicated page. After I installed another megabyte (which was simply a matter of sliding a card into the back of the printer), I could not overload the OL400e. This printer holds up to 4MB of RAM, which most desktop applications would never use.

The OL400e placed in the top three on all four of the speed tests, and I found the print quality excellent. The only drawback was this printer's use of PCL 4, which meant that it could not print the reverse type in the newsletter. Other than that, text and graphics printed crisp and clean, with clear, definitive strokes and minimal stairstepping. The gray-scale photograph printed as well on this printer as on anybody else's, and the CorelDRAW! drawing had minimal banding.

Like the HP and Brother printers, the OL400e talks back to your computer. For example, if the printer runs out of memory or paper or encounters another problem, it displays a message in Windows. Although this really is not a network printer, these messages are particularly helpful when the printer is in another room or not in plain sight, such as on a multiple-tiered computer stand where the printer is hidden by the shelf that holds the keyboard.

You won't believe how light and small this printer is. It's almost small enough to pack up and take with you. Lifting it out of the box, I wondered about its sturdiness. But paper runs through it smoothly, and all the parts and doors fit precisely. There's no reason to believe it won't last. Okidata's engineers deserve a lot of credit.

The OL400e's use of PCL 4 places it a little behind HP's LaserJet 4L in options and quality. Another drawback is that at press time there was no way to get PostScript output from it. However, Okidata says a PostScript option is in the works. Aside from these grievances, there's no reason not to consider this printer. If it supported PCL 5, I would consider it the best printer in this bunch, hands down.

Circle Reader Service Number 248

Okidata OL400e—$699 SRP for base unit
Warranty: one year, parts and labor; five years on LED printhead

OKIDATA
532 Fellowship Rd.
Mt. Laurel, NJ 08054
(609) 235-2600

PANASONIC KX-P4410

My first impression of this printer was that it was big and sturdy—and that it is. The Panasonic KX-P4410 is, however, a little long in the tooth and in need of upgrading. For example, its separate toner and developer cartridges make it somewhat more difficult to set up than the others. And adding memory requires too much disassembly. The KX-P4410 supports PCL 4, which means print quality and options are lacking, and it has only five resident fonts. But then, if you use Windows, resident fonts aren't a big issue. What you get with the KX-P4410 is a well-built workhorse that's liable to last just about forever.

The more I played with this printer, the more it reminded me of the HP LaserJet Series II, which was a fine printer in its day. In fact, most of those built and sold several years ago are still around, and several HP dealers have backlogs of companies that want to lease used ones. However, the Series II does not support scalable fonts, and halftone screen patterns are blotchy, as is the case with this printer. It's not the ideal device for

Panasonic KX-P4410—$769 SRP for base unit, $150 SRP for 1MB RAM
Warranty: one year, parts and labor

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The KX-P4410 scored near or at the bottom of my speed tests, and type and graphics are a little stairstepped and fuzzy. This is not to say that the quality is not acceptable; it's just not as good as with the others. The documentation is very thorough, though a bit too technical for an entry-level printer. It's obvious that at one time this was not an entry-level model.

This printer is not really suitable for desktop publishing and other graphics-intensive work. However, if you need a workhorse capable of turning out page after page of text day after day, this one will serve you well. It would hold up very nicely in an operation printing lots of in-house word processor, spreadsheet, and database documents. It would also be a good printer for generating a lot of copies of the same document.

Circle Reader Service Number 249

STAR MICRONICS LS-5EX

Star Micronics LS-5EX—$989 SRP for base unit, $1,144 SRP for review unit with 2MB RAM, $225 for TrueImage upgrade (requires 1MB RAM)
Warranty: two years, parts and labor

STAR MICRONICS AMERICA
420 Lexington Ave., Ste. 2702
New York, NY 10170
(800) 447-4700

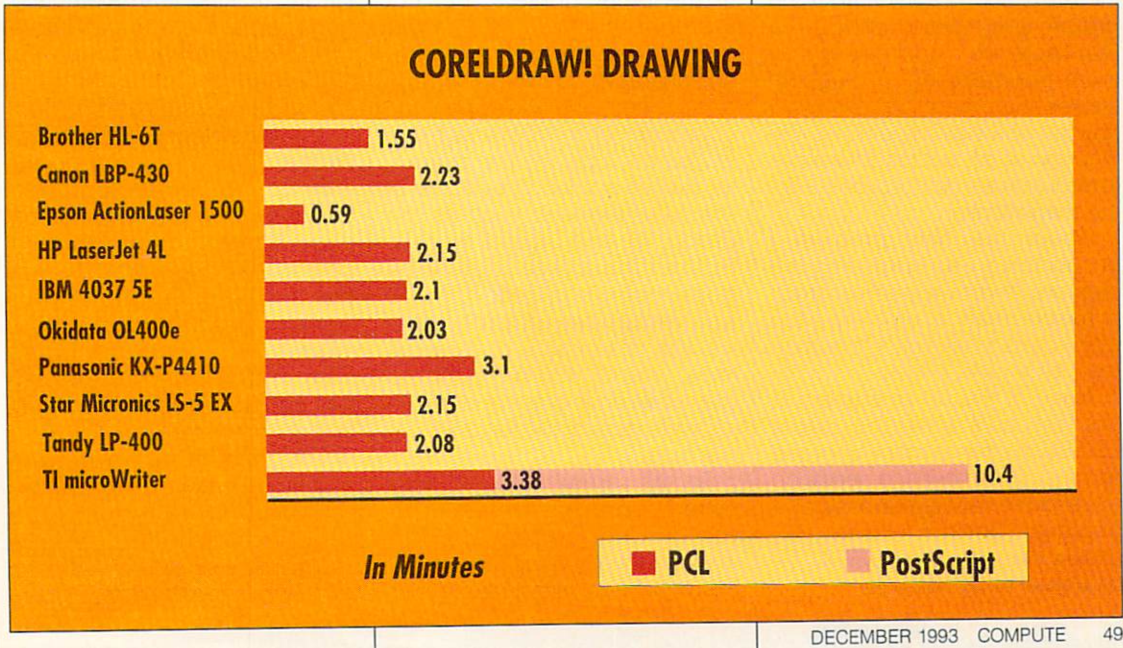
If you need a sturdy printer offering easy setup, PCL 5, good print quality, and speed, take a look at the LS-5EX.

The LS-5EX rated in the top three on all four tests, and its print quality is as good as that of any of the other printers. But the real story behind this printer is upgrade options. For a few extra dollars you can transform this machine from a modest personal laser into a powerful workhorse. It has the highest maximum memory configuration of all these printers—7MB. You can get a 500-page input tray; the toner cartridge has a 4500-page print duty cycle; and, with the PostScript upgrade, the printer supports AppleTalk, which makes it a great network printer.

There's also a TrueImage upgrade available. TrueImage is Microsoft's PostScript clone, which may or may not eventually catch on and become popular. The printer comes with 15 TrueType fonts, which you can use with Windows.

All this power comes at a price. This is a big, bulky printer, not nearly as compact as the Okidata or HP offering. The thorough manual becomes a bit technical in places, with much information on programming the printer.

I like the convenience of the LED and button panel. The LED is easy to read, and the buttons are easy to figure out. Also, when you press a button, the printer gives you instructions on what to do next. For example, when you press the test button, a message



flashes on the LED, telling you to hold the button for two seconds to print a test page. This printer is full of neat little features.

Also worth discussing are the speed and print quality of the LS-5EX. While the Epson printer turned out slightly faster times on most of the tests, the LS-5EX output looks a little better. In addition to sharp, crisp type, the graphics are quite good for a 300-dpi printer. This is attributable to the Star Micronics Resolution Enhancement Procedure (REP). REP increases horizontal resolution to 600 dpi, which helps fill in curved and diagonal edges.

The only way to test how well these resolution enhancement routines work is to analyze the output. Using a magnifying glass, I examined text and graphics from the printers using these routines. The Star Micronics model had slightly more stairstepping in diagonal strokes than the other printers; I noticed this stairstepping in *A*'s, *W*'s, and so on. But the differences in resolution are not noticeable without magnification.

About the only problem I encountered was upgrading the memory. And it was really more of a hassle than a problem—too many parts to take off. Other than that, it's a great printer.

None of the other printers in this Test Lab are as sturdy as the LS-5EX or offer as many upgrade options. If your printing needs go beyond the modest abilities of a personal desktop laser, you should consider the LS-5EX.

Circle Reader Service Number 250

Tandy LP 400—$799.00 SRP for base unit, $199.99 SRP for 1MB RAM
Warranty: one year, parts and labor

RADIO SHACK
1500 One Tandy Center
Fort Worth, TX 76102
(817) 390-3011

TANDY LP 400

This printer is easy to set up and has great documentation. I had it up and printing in a very short time. Like the Panasonic printer, though, this machine has a few limitations that make it less than ideal for all applications.

The LP 400 requires a lot of memory to print a page of text and graphics, and it emulates the HP IIP, which limits output options and quality. Like the other devices in this review that do not support PCL 5, it cannot print reverse type and does not support scalable fonts—unless, of course, you're printing from Windows, which has its own font-scaling technology. Also, this printer's halftone screens aren't as clear as those from some of the other printers reviewed in this roundup. And it's a little slower than most of the other printers, but not excruciatingly so.

The LP 400 prints too dark, and character spacing is not very good. Often, characters print too close together or overlap each other. You don't get the fine character strokes produced by some of the other printers, such as the Epson, HP, and Okidata models. But the thick strokes do eliminate stairstepping in large text. This is also helpful when you print graphics with lots of arcs or diagonal lines. The LP 400 did print the gray-scale photograph and graphics well, especially for a PCL 4 machine.

To its credit, this printer doesn't take much space on your desktop. The LED is easy to read, and the buttons are easy to figure out and use. Printing font and test pages is easy, as is simple programming, such as changing interfaces and emulation modes. The memory upgrade is literally a snap; all you do is slip in a couple of SIMMs. In addition, Tandy has a great support team.

The LP 400, like the Panasonic model, is built very well, and it should last a long time under a heavy workload, where some of the other light, compact models may not prove as durable. I think it would be best suited for an office that generates lots of documents for its own consumption, such as interdepartmental reports or memos.

Circle Reader Service Number 251

TEXAS INSTRUMENTS MICROWRITER

Of the ten low-cost printers reviewed here, only Texas Instruments' microWriter comes standard with PostScript, making it the printer of choice for desktop publishing. PostScript is required for printing PostScript graphics and for proofing output intended for imagesetters, color-proof printers, and slide recorders. The microWriter also emulates the HP IIP, making it an all-around, good printer for home and small business. And with its support for AppleTalk, you can use it with a Macintosh or on a network.

The advantages of PostScript are many. For example, the newsletter used to test these printers had two EPS images on the front page. None of the other printers could print them properly—all that printed were low-resolution screen representations of the images. Also, draw programs such as CorelDRAW! create certain effects that non-PostScript printers cannot print.

The microWriter is a huge, sturdy thing. It comes out of the box easily and I found it a snap to set up. The one that I tested came configured with 2MB of RAM (the amount required for our tests); con-

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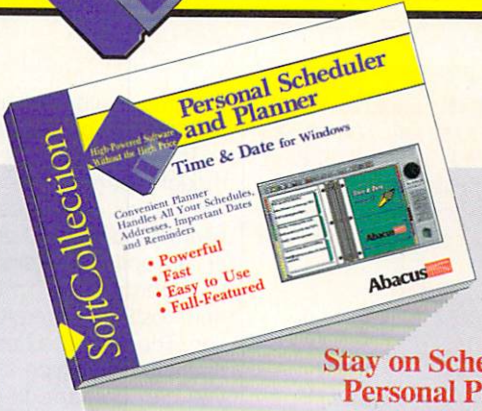
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Convenient Planner Handles All Your Schedules, Addresses, Important Dates and Reminders
• Powerful
• Fast
• Easy to Use
• Full-Featured
SoftCollection
Abacus

Stay on Schedule... Personal Planner

A daily planner keeps track of your schedule and helps you find information quickly. This is precisely how **Time & Date** can help you work smarter. It's an easy-to-use appointment and project manager with built-in reminders. And it also helps you organize all of your addresses, notes and important dates.

The New *Soft*Collection from Abacus

Special Features include:

- Daily planner - week/month/year views
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Turn your PC into a Windows planetarium. Complete database of 10,000 stars (with technical info) from 200 places worldwide.
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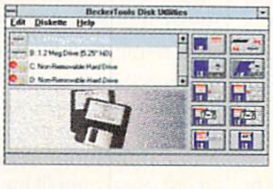

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Analyze and reconfigure your system to supercharge Windows with this slick, convenient group of utilities.
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Manage your addresses, contacts, books, VCR tapes and more. This fast and simple database manager has a report generator and more.
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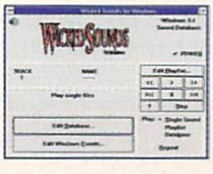

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Texas Instruments microWriter—$599 SRP for base unit, $99 SRP for 1MB RAM, $198 SRP for 2MB RAM, $350 for 23 PostScript fonts, $650 for 65 PostScript fonts
Warranty: one year, parts and labor

TEXAS INSTRUMENTS
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sequently, I didn't have an opportunity to evaluate the memory-upgrading process. However, 2MB is seldom enough memory for a PostScript printer, and the microWriter is no exception. In PostScript mode, it was not able to complete the full-page CorelDRAW! drawing and a couple of the newsletter pages. Also, the shortage of memory caused numerous timeout errors from Windows. I finally had to set the Retry option in the Windows PostScript driver to over 300 to get the newsletter to print.

PostScript printers print faster with more memory. The graphs in this Test Lab show how slow the microWriter is with only 2MB. I didn't test it with more than 2MB, but the printer would undoubtedly print faster with twice as much memory. A drawback of the microWriter is that it can hold only 4MB of RAM. While this is enough for most applications, graphics applications could require more.

Note, however, that the printer had plenty of RAM for the HP emulation tests. It turned in respectable times in HP mode, except on the CorelDRAW! drawing. For some reason it was too slow on that one. But then, I had a similar anomaly with the HP LaserJet 4L, which fell way behind on the gray-scale test but performed respectably on the others.

The microWriter documentation, though sparse, is clear. It covers the basics, and these days few users need more. There is, however, an optional reference manual that contains HP programming and PostScript interpreter information. The standard PostScript configuration is 17 Type 1 fonts, which you can upgrade to 65. There is also a 2MB font upgrade that adds several PCL fonts to the base IIP configuration.

Although some of the printers in this review are sleeker and have a few more sophisticated features than this one, PostScript makes the microWriter an excellent value—even if you do have to spend a little extra to get enough memory. Some of the other printers here offer PostScript upgrades, but in most cases you'll have to upgrade the memory, too. If you don't need graphics or desktop publishing capabilities, one of the other printers may be better suited to your application. But if you print graphics often, you should consider the microWriter.

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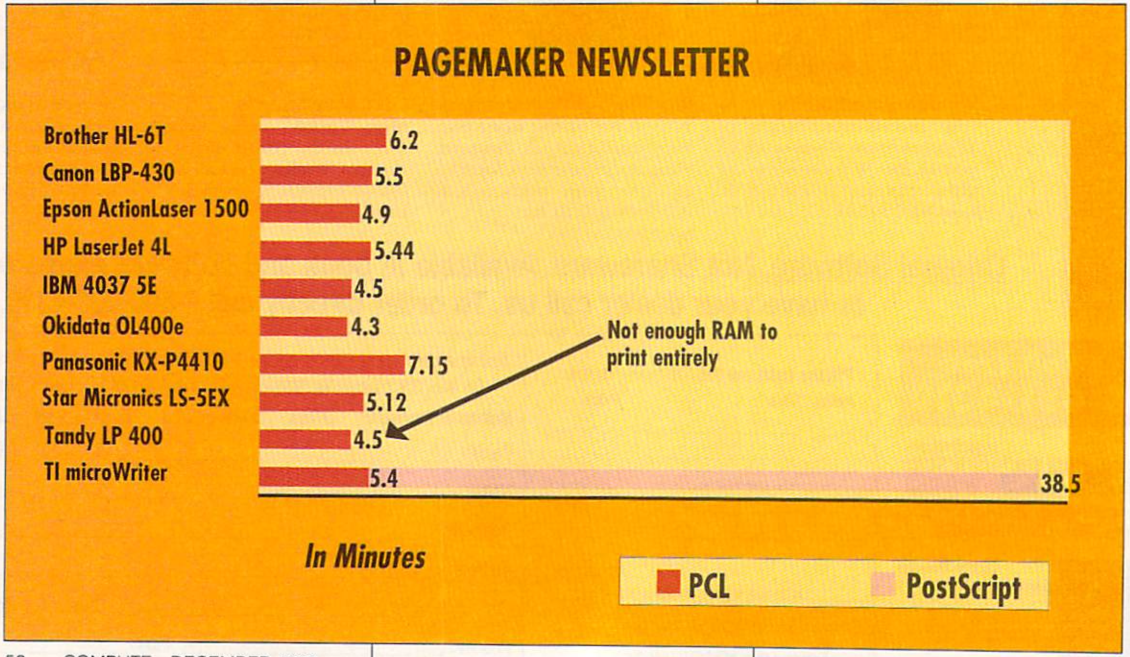

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NOT HAVING ONE
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CYBERMAN

Now moving in a game is as easy as thinking about it. Only CyberMan moves in three directions (x, y, and z) and three rotations (pitch, yaw, and roll), which correlate directly to your moves inside a 3-D game; your intuitive movements translate literally to the screen.

It's also the only controller with tactile feedback that makes you a physical part of the game. CyberMan is available now at your local dealer, or call **1-800-732-2923**.

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LOGITECH

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Printer Features

	Brother HL-6T	Canon LBP-430	Epson ActionLaser 1500	HP LaserJet 4L	IBM 4037 5E
Memory options	up to 4MB	up to 4MB	up to 5MB	up to 2MB	up to 4.5MB
HP LaserJet emulation	PCL 4	PCL 5	PCL 5	Enhanced PCL 5	PCL 4
PostScript	optional	no	optional	no	no
Epson FX80 emulation	yes	no	yes	no	no
Input tray capacity	150	100	150	100	150
Output tray capacity	100	50	100	50	100
Envelope feeder	yes	yes	yes	yes	yes
Optional paper tray sizes	250	no	250	no	400
Resident fonts	48	15	27	26	16
Recyclable toner cartridge	no	yes	no	yes	yes
Toner cartridge life (in pages)	3500	3000	6000	3000	3500
Cost per page (in cents)	2.7	0.28	2.7	0.3	3.2
Pages per minute	6	4	6	4	5
Windows printer driver	yes	yes	yes*	yes	yes
Interfaces supported	serial & parallel	parallel	serial & parallel	parallel	parallel
Microprocessor	MC68000	National Semiconductor	MC68000	MC68000	MC68000
Microprocessor speed	16 MHz	14.6 MHz	16.67 MHz	16 MHz	10 MHz
Engine life (in pages)	300,000	100,000	180,000	indefinite	3500
Engine manufacturer	Canon	Canon	Minolta	Canon	Lexmark
Weight (in pounds)	21.5	15.4	15.5	29	24
Dimensions (in inches)	13.8x16.5x9.1	14.5x14.8x6.2	8.9x14.5x18	14.5x14x6.5	9.7x15x17.6

*Must use the HP IIP Windows driver.

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Your Child Will Love Allie's Playhouse.™

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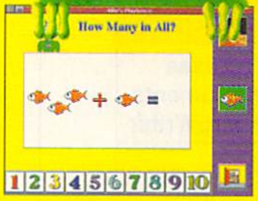
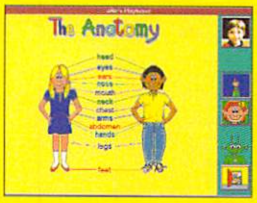

How Many in All?
1 2 3 4 5 6 7 8 9 10

Children learn about counting with 4 different activities.

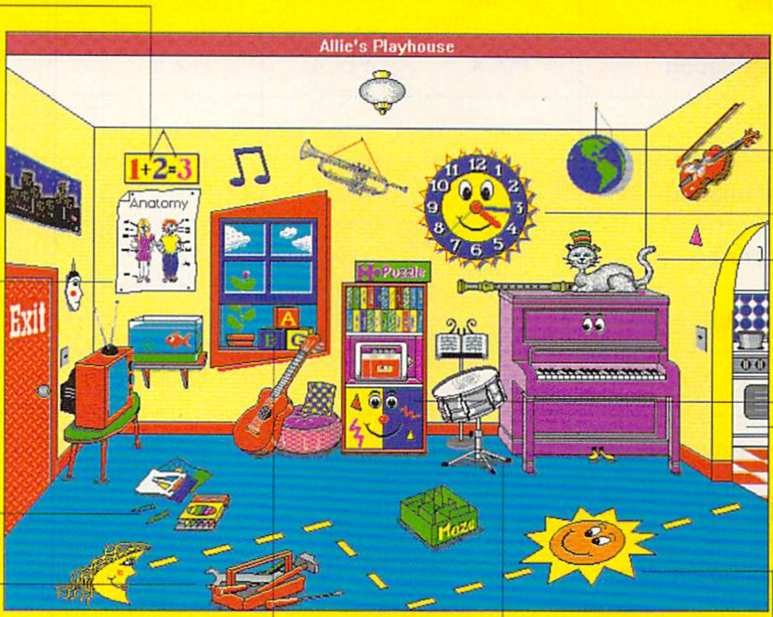

The Anatomy
head
eyes
ears
nose
mouth
neck
chest
arms
abdomen
hands
legs
feet

Children will learn to identify certain parts of their bodies.

A "multimedia" coloring book, especially designed for kids.

Instrument Construction Kit

Kids love to construct and play their own musical "instrument."


Allie's Playhouse
1+2=3
Anatomy
Exit
MePuzzle
Maze

Your child will love to learn and explore with Allie, the cute little alien friend who serves as the guide to countless hours of valuable educational activities.

_ouse
a b c d e f g h i j k l m
n o p q r s t u v w x y z

Kids learn the alphabet and spelling and hear letters and words pronounced.

Kids can play and record their own music.

The Continents

Kids learn about continents and how to identify them.

Mr. Clock
"Digi"

Mr. Clock and "Digi" teach children how to tell time.

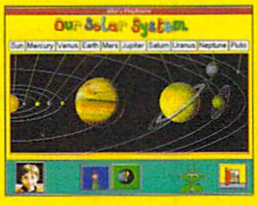
Animal Farm
a frog
a cat
an elephant
a pig
a cow
a rooster
a dog
a sheep

Children learn about animals and hear and identify them.

Twink-le, twink-le, lit-tle star,
how I won-der what you are.

16 nursery rhymes for kids to join in and sing along with.

In the kitchen, kids build sound and object recognition skills.


Our Solar System
Sun
Mercury
Venus
Earth
Mars
Jupiter
Saturn
Uranus
Neptune
Pluto

Kids learn about our solar system and how to identify the planets.

Allie's Playhouse is a comprehensive collection of 16 different educational activities designed to stimulate young minds, including:

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MPC Multimedia PC

A Windows CD-ROM Product

Printer Features

	Okidata OL400e	Panasonic KX-P4410	Star Micronics LS-5EX	Tandy LP 400	Texas Instruments microWriter
Memory options	up to 4MB	up to 4.5MB	up to 7MB	up to 2.5MB	up to 4MB
HP LaserJet emulation	PCL 4	PCL 4	PCL 5	PCL 4	PCL 4
PostScript	no	no	optional	no	yes
Epson FX80 emulation	no	no	no	no	no
Input tray capacity	100	200	200	100	200
Output tray capacity	100	100	100	100	100
Envelope feeder	yes	yes	yes	yes	yes
Optional paper tray sizes	legal	200	250 & 500	300	250
Resident fonts	57	5	22	14	17
Recyclable toner cartridge	no	no	no	no	yes
Toner cartridge life (in pages)	2000	3000	4500	1500	2500
Cost per page (in cents)	1.4	3.3	2.4	3.8	4.8
Pages per minute	4	5	5	4	6
Windows printer driver	yes	yes*	yes	yes*	yes*
Interfaces supported	serial & parallel	parallel	serial, parallel, & AppleTalk	parallel	serial, parallel, & AppleTalk
Microprocessor	LSi	National Semiconductor	i809600SA	MC68000	MC68000
Microprocessor speed	32 MHz	15 MHz	16 MHz	20 MHz	16 MHz
Engine life (in pages)	150,000	180,000	150,000	150,000	indefinite
Engine manufacturer	Okidata	Matsushita	Fuji/Xerox	TEC	Samsung
Weight (in pounds)	13.5	29.8	29.7	28.7	33
Dimensions (in inches)	12.6x14.2x6.3	14.6x15.5x9.3	10x13.9x15.5	7.75x14.25x16	10.4x13.8x14.8

*Must use the HP IIP Windows driver.

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Make the big decisions with four addictive strategy games from MicroProse.

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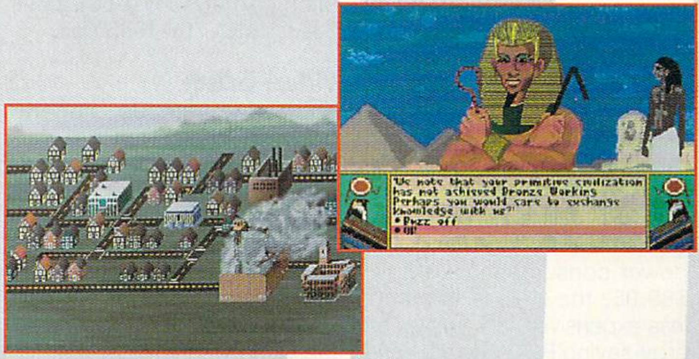
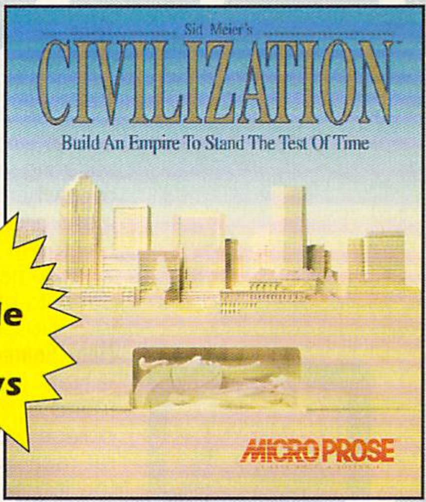
Play entertainment software's most highly acclaimed computer game! As the guiding spirit of your own civilization, you'll build complex cities, balance economic growth with military power, and compete with history's greatest leaders.



We note that your primitive civilization has not achieved Bronze Working. Perhaps you would care to exchange knowledge with us?
• Buzz off
• OK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CIVILIZATION
Build An Empire To Stand The Test Of Time
MICROPROSE

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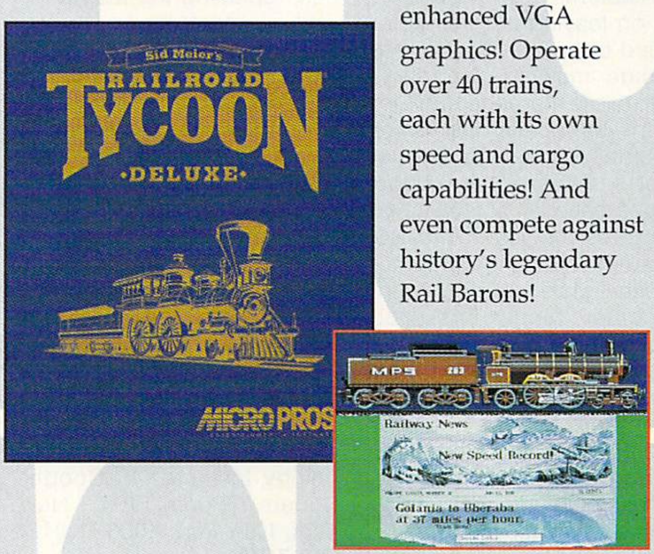
Sid Meier's
RAILROAD
TYCOON
·DELUXE·
MICROPROSE
MPS 283

Railway News
New Speed Record!
Goiania to Uberaba at 37 miles per hour.

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Play the all-new game of space exploration and combat from MicroProse! With a powerful fleet of space ships at your command, you'll battle, trade, and negotiate with ten alien races. Develop new technologies. And expand your colossal empire as you inhabit or exploit inhospitable worlds.

Build an empire to span the galaxy.
MASTER OF
ORION
MICROPROSE

How may our empire serve you
• Propose Treaty
• Form Trade Agreement
• Threaten/Break Treaty and Trade
• Offer Tribute
• Exchange Technology

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GAP

NEWS & NOTES

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If you have a job-hunting friend or know a soon-to-be college grad in training for the rat race, something to make the job search easier could be the best gift under the tree. JOBHUNT from Scope International is an aggressive software package (more to the point than figuring out the color of your parachute) that provides something essential to every job search: full contact information, including current names, addresses, telephone and fax numbers, and company descriptions for more than 5000 potential employers across the country. Job hunters can search through the database by region, job function, or Standard Industrial Classification (SIC) code. The program quickly prints personalized or mail-merged cover letters, job applications, and any letter typed in. Just attach a résumé and mail. Suggested retail price is $49.95. Look for JOBHUNT at your local retailer or contact Scope International, P.O. Box 25252, Charlotte, North Carolina 28229-5252; (800) 843-5627, (704) 535-0617 (fax).

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Help your friends save money while turning their PCs into green machines with PC Ener-G Saver, a hardware/software combination that helps make PCs more energy efficient. They consume less power, thus cutting utility bills. It consists of a unique power strip and TSR software, and it connects to any IBM-compatible computer monitor, keyboard, and printer running under DOS or Windows. The product senses when the system is no longer in use and automatically switches it into a power-saving standby or "sleep" mode; however, it's ready for use the moment the user presses a key or moves the mouse. The system complies with the EPA's Energy Star guidelines for reducing PC power consumption. At only $89.95, the device is much less expensive than a new, energy-saving PC—and it slashes the cost of powering one to a mere $20 a year. Contact PC Green Technologies, 1 Centerpointe Drive, #210, La Palma, California 90623; (800) 984-7336, (714) 228-2239 (fax).

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You know how some people insist on leaving the computer turned on, even when they're outside mowing the lawn? Well, this is the perfect gift for them—especially if they're baseball fans. Lights Out Sports Fans is a major-league baseball screen saver that gives you year-round, 24-hour action on the computer screen—while you're busy doing other things! First, you choose your default home and visiting teams from among the 28 major-league logos; then, you select your screen-saver action from any of ten different game plans. For example, you can pit any team against another, mix National and American League players on the same team, play games using actual stats, give your home team the advantage, or let the computer slug it out by itself. And if you choose, the program produces all sorts of authentic ballpark sounds—even if there's no one there to hear them! Suggested retail price is $55. For more information, contact Quadrangle Software, 305 East Eisenhower Parkway, Suite 208, Ann Arbor, Michigan 48108; (800) 253-8397, (313) 769-1695 (fax).

Virtual College

There's no campus, student body, or classroom per se, but the four credit hours and six-week educational experience are quite real. It's New York University's Virtual College, part of the school's continuing education program. For a fee of $1,933, anyone in the world with access to a PC and modem can sign up. According to NYU, the Virtual College is merely another sign of the times—"a virtual college preparing employees for tomorrow's virtual organizations." Telecommuting and teleconferencing are becoming the norm for many employees, replacing the traditional work environments, and the Virtual College is merely an extension of this trend, teaching skills necessary for jobs of the future. Using Lotus Notes, a group-communications program provided free to each person who enrolls, students collaborate online during the six-week period—at any time of day or night—and participate in the development of a major systems project. All work is conducted from the individual's own home or office PC. For more information, contact the NYU Information Technology Institute, 48 Cooper Square, Room 104, New York, New York 10003; (212) 998-7190.

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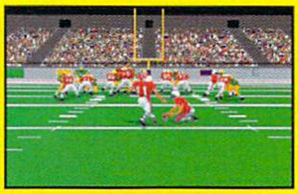
(HIT ESCAPE AND SELECT A BETTER PLAY.)

Or quit and start a new game. Because this is your turf. Your rules. Your game.



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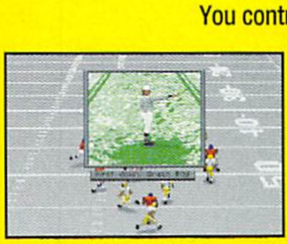
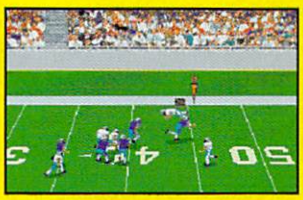
You don't just control the game. You control the whole NFL league. With real NFL rosters and stats. This is your chance to coach your way out of a paper bag.



So pick your team, call the plays, and watch your players spin, flip, dive, and crunch. It's so real, you can feel the pain.

You control every last detail because you're the coach. So go ahead. Design depth charts and sub in and out whenever you want. Your number one running back is tired? Give him a rest. Your quarterback isn't cutting it? Trade 'em. Hate Dallas? Make 'em wear pink.



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PaperTemplate Illustration Guide

Stop settling for someone else's holiday greeting; PaperDirect sells the cards you can call your own.

One Man's LAN

For the person who works with more than one PC and wants LAN capabilities without the usual complexities and cost, One-Man-LAN is the answer.

Mimicking a LAN file server, this neat new product from PC InterConnect lets you access programs installed on *secondary* PCs as though they were installed on your primary PC, and it allows you to print from secondary machines.

There's no need to throw away your old computer—your spare PC's hard drive can be used to augment your system as an additional drive for your primary PC, as well as for disk caching.

One-Man-LAN is easy to

ALTITUDE ENCODER EQUIPPED
40
60
80
ALT
OFF
ZOOM
1.0
LIGHTS
OFF
COM
120.
NAV

install, runs quickly, and is completely DOS compatible (and it isn't limited to interconnecting just two PCs). The suggested retail price is $199 for a two-PC configuration, including hardware, software, documentation, toll-free customer support, Stacker, and the latest version of PC-Kwik disk-caching software. Contact PC InterConnect, 106 Library Plaza, 15 North 100 East, Provo, Utah 84606; (801) 374-8880; (801) 374-2306 (fax).

A Whiteboard for the PC

Slightly more expensive than your basic whiteboard but with many more applications, SoftBoard is a nifty new peripheral device that lets you combine using a whiteboard with your desktop computer. Whatever you write on the SoftBoard surface with the special SoftBoard colored markers, which are included with the package, is simultaneously displayed on your PC or Mac. The data can then be saved, printed, used in another application, or shared with other users in realtime—even those in multiple locations. Suggested retail price is $2,995. Contact Microfield Graphics, 9825 Southwest Sunshine Court, Suite A-1, Beaverton, Oregon 97005; (800) 334-4922, (503) 641-9333 (fax).

The Gift of Knowledge

You say you've run out of money by now? Just tell students (and anyone else on your list who could benefit from good research sources) about the two new R. R. Bowker online biographical directories. The most recent editions of *Who's Who in American Art* and *Who's Who in American Politics,* in addition to the previously released *American Men and Women of Science,* can now be accessed as part of file 236 on DIALOG Information Service.

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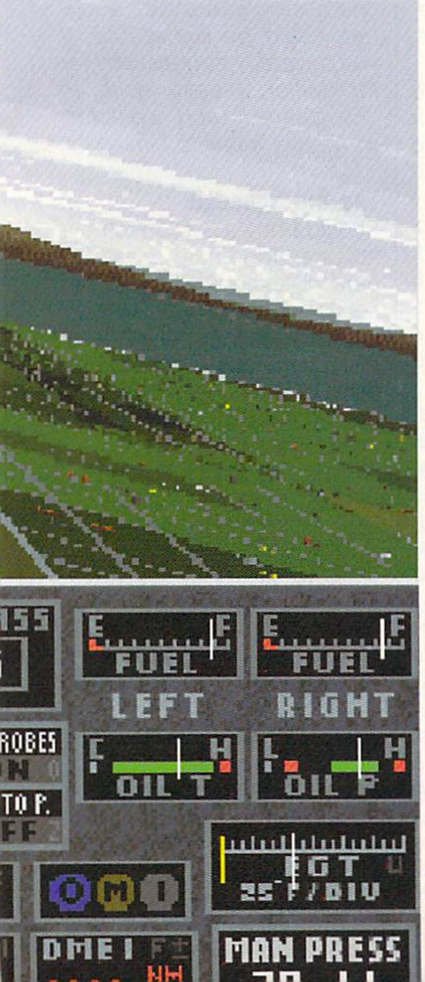

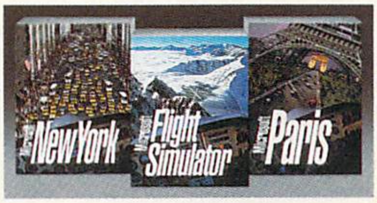

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FEEDBACK

Adding a Toaster to your PC, translating technobabble, scanning beer bottles, putting a hard drive where your printer should be, and changing cats into docs

Toast

Is NewTek making a version of the Video Toaster for PCs? When will it be shipping?

BRETT REAGAN
SULLIVAN, MO

It's been out for a while. NewTek makes a version for the PC and for the Mac. But in these versions the Video Toaster just uses the PC or Mac as an input device. All the real work is done by an Amiga computer built into the Video Toaster.

Foreign Language

I'm planning to purchase a new computer, but when I check the advertisements, I find many things that confuse me. Would you mind explaining the following for me?

1. Windows accelerator
2. SIMM
3. Cirrus Logic 1-meg VESA card
4. VESA Lb IDE controller
5. Local-bus technology
6. 486 DX/33 VESA
7. 386 DX/40 AMD

Can a modem receive and send faxes? Can a scanner create text files? What should I know and notice when I purchase a new computer? And do you have a fax number?

LAWRENCE LI
ETOBICOKE, ON

That's quite a list. We'll do our best.

1. Windows takes a lot of processor time away from your CPU, resulting in reduced performance for most computers. A Windows accelerator takes over the processing needed to refresh the screen, leaving more time for the CPU to do its job.

2. SIMM chips are a special kind of RAM designed to be easy to replace and upgrade.

3. VESA is a standards organization whose purpose is to make sure Super VGA standards are maintained. Although we can't be sure, we suspect that the VGA card you're asking about is equipped with 1MB of RAM (for lots of colors at high resolution) and follows the VESA standard. However, its description might mean that the video card is on the local bus. You should clarify this point with the sales department.

4. Lb is an abbreviation for local bus. *Instead of having its IDE controller on the expansion bus, the computer has its IDE controller on the local bus.*

5. Local-bus technology is technology that places peripherals that might otherwise be on the 8-MHz expansion bus on the local bus, which usually operates at the same speed as the processor. This gives peripherals such as video cards and hard disk controllers a little extra scoot.

6. Listing VESA alongside the processor is probably an indication that the machine has a local-bus connector, in this case a VESA local bus (as opposed to the Intel local bus, an alternative standard).

7. AMD is a maker of 386 chips. The manufacturer lists AMD so you'll know that the computer isn't an Intel-based machine.

A data/fax modem can receive and send faxes (some data/fax modems are send-only, so you should check before buying). Unless they're designated as data/fax or fax modems, modems can only send and receive computer files.

Scanners can only import images. Many manufacturers make computer software that can turn images into text—if they're images of text, that is.

We can't tell you in this brief space what to look for in a computer, though we frequently run articles on that subject. The two most important things in considering a purchase are to buy from someone who will honor a guarantee and to buy enough computer to do your work.

Our fax number is (919) 275-9837.

On the Bias

I need to hand-scan beer bottles (I collect them). But none of the scanners I've seen can scan a curved surface.

STEVE MILLER
ARNPRIOR, ON

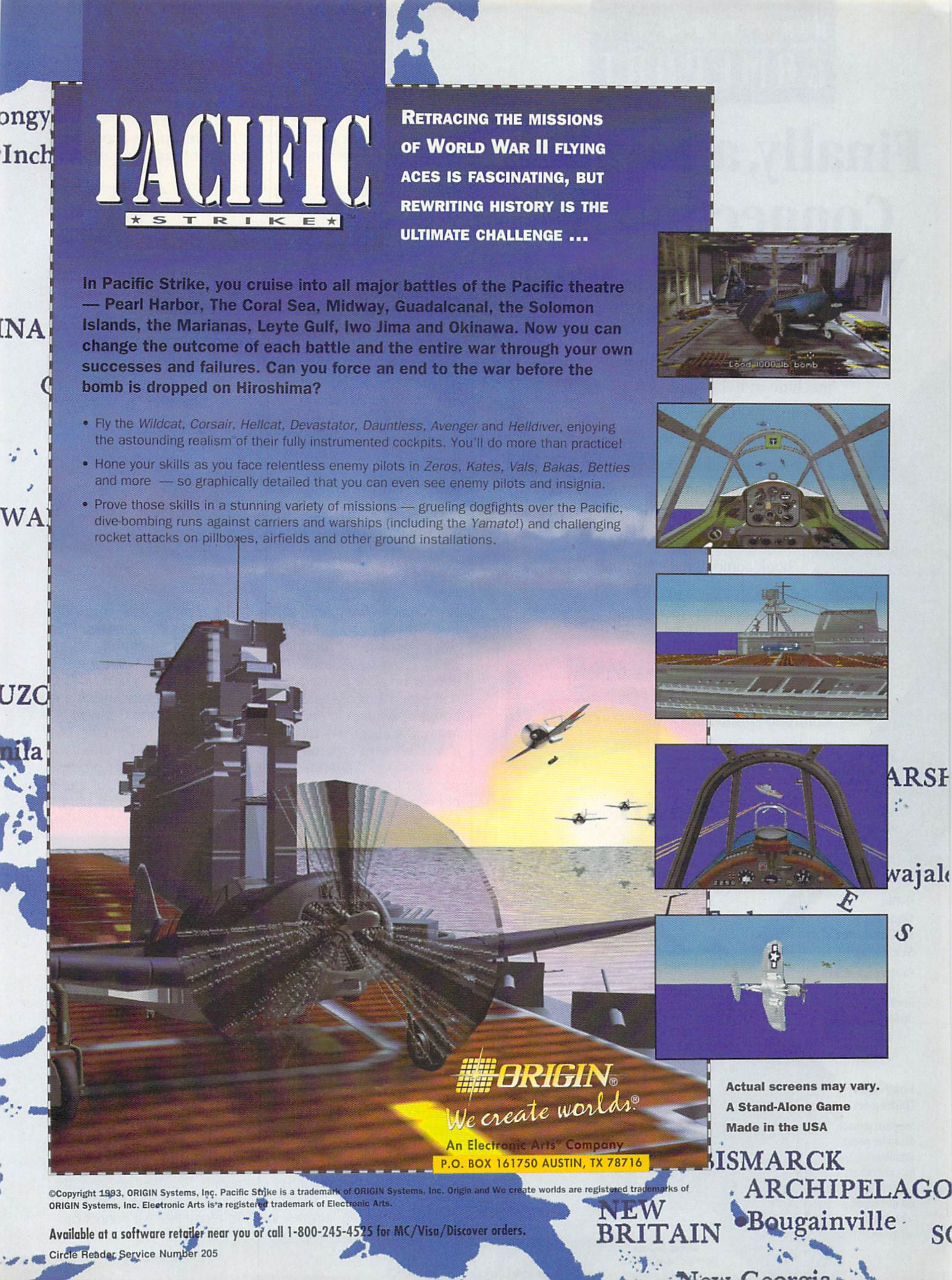
We're running your letter in the hope that someone will have a solution to your problem. If you have phenomenal control over your hands, you could scan the bottle with a flatbed scanner, being careful to roll the bottle in such a way that it's always directly above the light bar. This would be one case where a slow scanner would be preferable. If you have any suggestions for Mr. Miller, please write to "Feedback," and we'll forward your ideas to him.

The Big Squeeze

Should I buy a SyDOS removable-cartridge hard drive? My hard disk keeps filling up. Also, one of the things that confuses me is that the external disk drive hooks to the parallel port. Does that mean I just unplug my printer?

PAT SIMMONS
GULFPORT, MS

Ah, the ever-cramped hard disk. If only someone would come up with an acceptable solution. An accordion drive, perhaps, or a balloon drive that expands when the pressure inside becomes too great. The SyDOS will probably solve your problem, but rather expensively. The cartridges aren't cheap. Generally, appliances other than printers that use your parallel port have a pass-through connector that allows you to use your printer at the



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FEEDBACK

continued from page 62

same time. Check with SyDOS to be sure, but we expect that you would at least have the option of installing a pass-through plug.

It would seem that using Stacker or DoubleSpace would solve your problem, but these programs are only temporary solutions. Recently, we became aware of a product called Infinite Disk (Chili Pepper Software, 1630 Pleasant Hill Road, Suites 180–200, Atlanta, Georgia 30136-7411; 404-339-1812; $189). It tracks disk use and compresses infrequently used files. Rarely used files are offloaded to floppies. The operating system thinks the offloaded files are still on the disk, though. When you access a file that's been offloaded, Infinite Disk prompts you to insert the floppy that contains the file, and the file is accessed as if it were on the hard disk.

Undoc DOS

I've discovered an undocumented DOS 5 command: Truename. It returns the current drive and directory.

JAMES HEMPHILL
CHARLOTTE, NC

Conversion

I upgraded from a Canon Cat word processor to a PC. All my valuable word-processing files are on Canon-format disks which the PC can't read. How can I transfer the files?

GUNTHER DOERFERT
KINGSPORT, TN

We receive many letters like yours from people who purchased various kinds of dedicated word processors. The disks these word processors use are frequently the same disks used by PCs, so it would seem logical that the PC should be able to read them. Generally, this isn't the case, however. Word processors use their own formats, which are completely alien to the PC. Canon said that the Cat was fitted with a telephone plug for telephone communications, but it was very sketchy on how the hookup could be effected. According to Canon, you could convert your word processor files to ASCII and then modem them to a PC, but that's not recommended because "You would lose a lot of data." Clarifying this point, Canon said that you'd lose both formatting and text.

If you know someone who has a scanner and OCR software, you might print out your text files and then have your friend scan the printouts. That would also result in some loss (no OCR is 100-percent accurate).

There are companies that convert information from one disk format to another for a fee. If any readers know of a company that transfers information from Canon, Brother, Panasonic, or Smith-Corona word processors to PC disks, please send us that information, and we'll forward it to Mr. Doerfert and other readers who have similar file conversion problems.

Do you have a question about hardware or software? Have you discovered something that could help other PC users? If so, we want to hear from you. Call our special "Feedback" line: (900) 884-8681, extension 7010201 (sponsored by Pure Entertainment, P.O. Box 186, Hollywood, California 90078). The call will cost 95 cents per minute, you must be 18 or older, and you must use a touch-tone phone. Or you can write to "Feedback" in care of this magazine. Readers whose calls or letters appear in "Feedback" will receive a free COMPUTE baseball cap while supplies last. We regret that we cannot provide personal replies to technical questions. ❐

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INTRODOS

Tony Roberts

CHOOSING THE RIGHT PATH

The PATH statement is an integral part of your computer's operating system. Know its secrets, and it can make your system work much faster and more efficiently.

If you have trouble understanding the PATH statement and why it's there, consider this real-world example.

I have the habit of setting my car keys in only three places: on my desk, on my dressing table, or on a certain kitchen shelf. When I'm ready to go motoring and my keys aren't in my pocket, I check my desk, my bedroom, and the kitchen; 99 percent of the time, the keys turn up. By following my path, I can quickly achieve the required result.

Control your PATH, and your computer will be faster and more efficient.

DOS's PATH statement is similar: It describes places on your system that are most likely to hold executable files. Type a command at the DOS prompt, and the system checks the current subdirectory and then each of the subdirectories listed in the PATH to try to find the program you want to execute. By limiting the search path, you prevent the system from churning through the whole disk.

One of the problems with PATH statements, however, is that they tend to outgrow themselves. Prior to DOS 6, the PATH statement was limited to 127 characters. When you install software, the program often suggests that you add its subdirectory to the PATH statement. Eventually, the PATH line becomes too long and is truncated.

The major benefit of having a subdirectory in the PATH is that any program in that subdirectory can be executed from anywhere in your system without your having to enter the full path name. But the problem with a long PATH statement is that every time you execute a command, the system looks through all the subdirectories listed in the PATH; a long list can slow things down.

The best solution is to be stingy about what you put in the PATH. In most cases, include only subdirectories that must be available on a systemwide basis—DOS and Windows subdirectories for example. Also, create a BATCH subdirectory and put it on the PATH.

For all of your software, create a startup batch file in the batch directory. Have the batch file CD (Change Directory) to the appropriate subdirectory, and then start the application. Finally, upon termination of the application, have the batch file CD back to the root directory.

This system allows you to start any program with a simple command, and it allows the system to find and execute commands more quickly.

You've probably noticed the double dot (..) entry that appears when you ask for a directory listing of a subdirectory. This entry represents the parent of the current subdirectory. If you place the double dot entry in your path, you can start programs from the parent of whatever subdirectory happens to be current.

This can be a useful strategy if your hard disk data is structured properly. Some people install programs in one subdirectory and then store data in a subdirectory one level below the program. For example, if your word processor is in C:\WORDP, you might keep your document files in C:\WORDP\DOCS. With the double dot entry in the PATH, you could always start the word processor while the WORDP\DATA subdirectory was current. The same holds true for spreadsheet, database, and other data.

The PATH entry might look like this: PATH C:\;C:\DOS; C:\WINDOWS;..; C:\BATCH

If you use Windows, you've surely discovered that a lot of Windows software wants to be on the path. If you take it off, it just doesn't work right. But why have all those huge subdirectories on the path when you're working from DOS?

The solution is to use two paths, one for DOS and one for Windows. Start Windows from a batch file that toggles between the two path statements for you. Here's how it works.

If you type *path* at the DOS prompt, DOS will show you the current path statement. The sample batch file fragment below uses the DOS redirecton technique to copy the current PATH statement to a batch file. Then a new path, which points to Windows software, is established, and Windows is run. When you leave Windows, the system returns to the root directory and calls the batch file that was created by the first line of the program. Because that file contains an image of the previous PATH statement, the original PATH parameters are restored.

```
PATH > C:\BATCH\OLDPATH.BAT
 PATH C:\WINDOWS;C:\ALDUS;
C:\PM4;C:\EXCEL;C:\DESKSCAN
C:\WINDOWS\WIN %1 %2 %3 %4
C:
CD \
CALL C:\BATCH\OLDPATH
```

If none of this suits you and you own DOS 6, you can create PATH statements longer than 127 characters by including a PATH line in your CONFIG.SYS file. But once your long path is established by the CONFIG.SYS, you can't modify it from the DOS prompt or a batch file or it will be cut to the first 127 characters. ❒

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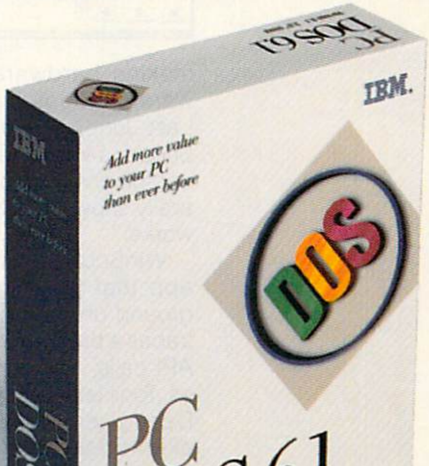


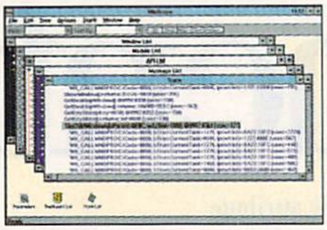
WINDOWS WORKSHOP

Clifton Karnes

WINSCOPE

If you spend your spare time peeping through other people's windows, you're liable to wind up in jail. But if you confine your voyeurism to other people's Windows *programs,* you're liable to become a Windows guru.

But what kind of binoculars do you use to see through the curtains, shades, and screens that hide what's going on behind the scenes in Windows? The answer to this question came recently from Periscope, a company famous for making hardware and software debugging equipment. Last June, it introduced WinScope, a Windows debugging and diagnostic tool that can literally show you how Windows works.



WinScope lurks on your desktop and spies on messages, API calls, hooks, and more.

WinScope is a Windows app that lurks in the background on your desktop and traces a program's messages, API calls, and hooks, as well as ToolHelp notifications and Debug kernel messages. It's akin to Microsoft's Spy and Borland's InSight, but it goes way beyond both in power and features.

When you run WinScope, you'll see that it's an MDI (Multiple Document Interface) program with a toolbar and a host of child windows. The Messages window shows a hierarchical list of all Windows messages. When you're tracing a program, you can tell it to record all messages, or you can select a small group. The API window likewise lists all of the Windows 3.1 API functions (including the undocumented ones from Schulman's *Undocumented Windows*), and you can have WinScope record all API calls or a subset. Two of the most important remaining windows let you select the modules and windows you want to trace.

At this point, you might be thinking that WinScope is complicated to use, but it's much easier to use than it may seem at first. Let's walk through a short WinScope session to see what it's like.

Recently, I wanted to find out how Windows Task List (called Task Manager in 3.0) tiles the windows on the desktop. I'd searched the 3.1 SDK documentation and couldn't find an API call that looked like it would perform this crucial task. WinScope might provide an answer, I thought, and it did. In fact, it gave me more information that I asked for.

The easiest way to trace a program in WinScope is to choose Load Application from the File menu. I did this, and from the file browser I chose TASKMAN.EXE. WinScope ran Task List, minimized itself, and started tracing. I pressed Task List's Tile button and, since that was the only thing I needed to check, pressed the Ctrl-Alt-S key combination that toggles WinScope's tracing on and off (as with most options in WinScope, you can customize this hot key).

I double-clicked on the WinScope icon to make it full-screen and started examining the Trace buffer. The Trace window displays messages and functions, including return values, and gives the time each event occurred relative to the previous event. Parameters, handles, and just about all the information you'd ever need are there.

Even though Task List was on my desktop for only a few seconds and I pushed only one button, the program and Windows generated a zillion messages and function calls. This is normal. There's a lot going on behind the often-simple scenery in Windows, and a program like WinScope shows you how much is happening.

The Trace buffer was far too large to scan line by line, so I decided to try WinScope's Find command. The first thing I did was to search for the word *tile* from the top of the buffer, but I started getting all of the stuff dealing with displaying the Tile button. I wanted to find the sequence of events that started with pressing the Tile button, so I decided to search from the bottom of the buffer up. I hit pay dirt doing this.

There was the API call I was looking for: TileChildWindows. But I hadn't been able to find this call in my references. I double-right-clicked on the function name to automatically call up the 3.1 SDK Help and was told that no function by that name existed. Aha! It must be undocumented! I took a look at *Undocumented Windows,* and there it was! And there was something very interesting just above the call to TileChildWindows—a call to GetKeyState with a parameter of 10. I checked, and the key represented by 10 is the Shift key. Now, why was Task List checking the status of the Shift key? I experimented, and sure enough, when I held down the Shift key and pressed the Tile button, the windows on the desktop tiled horizontally instead of vertically. WinScope had revealed an undocumented API call and an undocumented feature!

This is just one simple example of the kinds of things you can discover with WinScope. It's without a doubt the coolest Windows discovery tool I've ever seen. ❐

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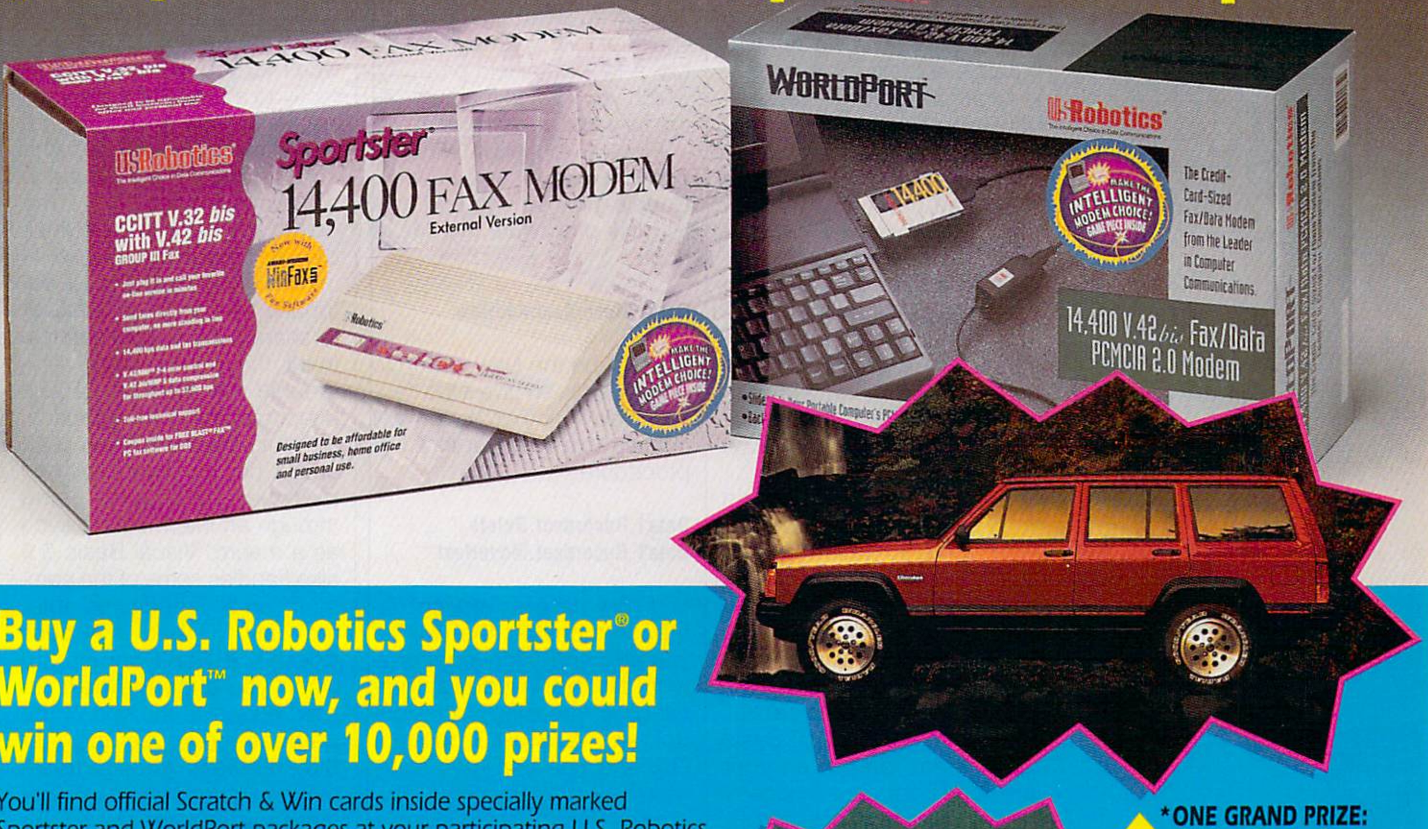
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PROGRAMMING POWER

Tom Campbell

VISUAL BASIC 3.0

I had planned to discuss Windows Help files this month, but the unexpected appearance of Visual Basic on my doorstep last Friday changed my whole weekend—and this month's column.

Microsoft hasn't given us Visual Basic programmers callbacks yet. What it has given us is database programming integrated neatly into the language itself, so easy to use that it constitutes a programming revolution. What with the ridiculously simple serial communications and graphics support in the Pro edition, the new database-handling features give Visual Basic an unparalleled bang for the buck. A heck of a lot of fun, too.

Only Paradox offers similarly elegant and simple database handling in its language, but ObjectPAL ain't BASIC.

It's been widely reported that Visual Basic 3.0 has the database manipulation engine from Microsoft Access built in. What the press hasn't figured out yet is that the result is in many ways better than Access itself! At the core of Visual Basic 3.0 is the data control. Pluck it from the Visual Basic toolbox and drop it on your form, and it appears, innocently enough, as a set of four VCR-style buttons. Press F4 to bring up the data control's property list and set the DatabaseName property to the name of a database file (it can be from Access, Paradox 3 or 3.5, dBASE III+ or IV, or Btrieve). You now have a list of the tables and fields in the database at your disposal without having to type or remember whether the field was called Last or Last Name. (An Access or Btrieve file can contain more than one table—what most people call a database—but the other products hold only one table per file.) Choose the table you want in the RecordSource property just by paging through it with the arrow keys. In a new application, this control will be the first one, and it will be given the default name Data1.

Now, for each field you want on the form, use a text box control. It has a new property called DataSource, which you'll set to the name of the table, and a DataField property, which you'll set to the name of the field you want it to display.

Finally, you might wish to add a few command buttons. Double-click on one and give its Click procedure this line of code.

```
Data1.Recordset.AddNew
```

This will be the New button to add records, so give it the caption New. Another button will contain this code for its Click procedure.

```
Data1.Recordset.Delete
Data1.Recordset.MoveNext
```

You now have a working database manager that will let you add and remove records with all the Windows trimmings of mousing, font control, and WYSIWYG printing. Oh, and you can give away as many copies of the program as you wish. Suddenly, the cost threshold for a developer to create and distribute robust, easy-to-use Windows database applications has dropped from about $1,000 to a couple of hundred. The Visual Basic Professional edition lists for several hundred more and is well worth the money, but the Standard edition is an unbeatable value. If you're an old database hack or plan to make a living off creating Visual Basic 3.0 database applications, go for the Pro, but if you're working with a tight budget, the Standard will do fine.

What's extraordinary is that it's actually easier to create a simple database application in Visual Basic than in Access. The generic button code you just saw, for example, doesn't work in Access, which needs a frightening agglomeration of intricate Access Basic statements and Windows API calls to do the same thing. And Access won't let you attach code directly to a button the way Visual Basic has always done. You must first create a macro and then attach that macro to a button. In some ways the macro approach is more flexible; Access even stores its macros in standard Access database files so they're easier to share among applications. In all, though, I'm more comfortable with the Visual Basic direct manipulation approach. It's more natural to think of an object having code attached to it than to think of going through an intermediary such as a macro. Visual Basic 3.0 also handles some of the common "error" conditions automatically that Access doesn't. It won't bother you when you click the next record button at the end of the database (excuse me—table), whereas Access treats that as an error and puts up a message offering to halt the macro attached to that button.

That's not nearly all, of course. The language now has support for database manipulation, and it doesn't stint anywhere. The manuals, borrowed from the already superb Access documentation, are chock-full of realistic examples that leave nothing to chance. Only Paradox offers similarly elegant and simple database handling in its language, but ObjectPAL, the Paradox language, ain't BASIC.

If you're a Visual Basic programmer who missed out on the $89 Access deal last year, don't feel left out. Fill out your 3.0 update card and send it in right now. ❒

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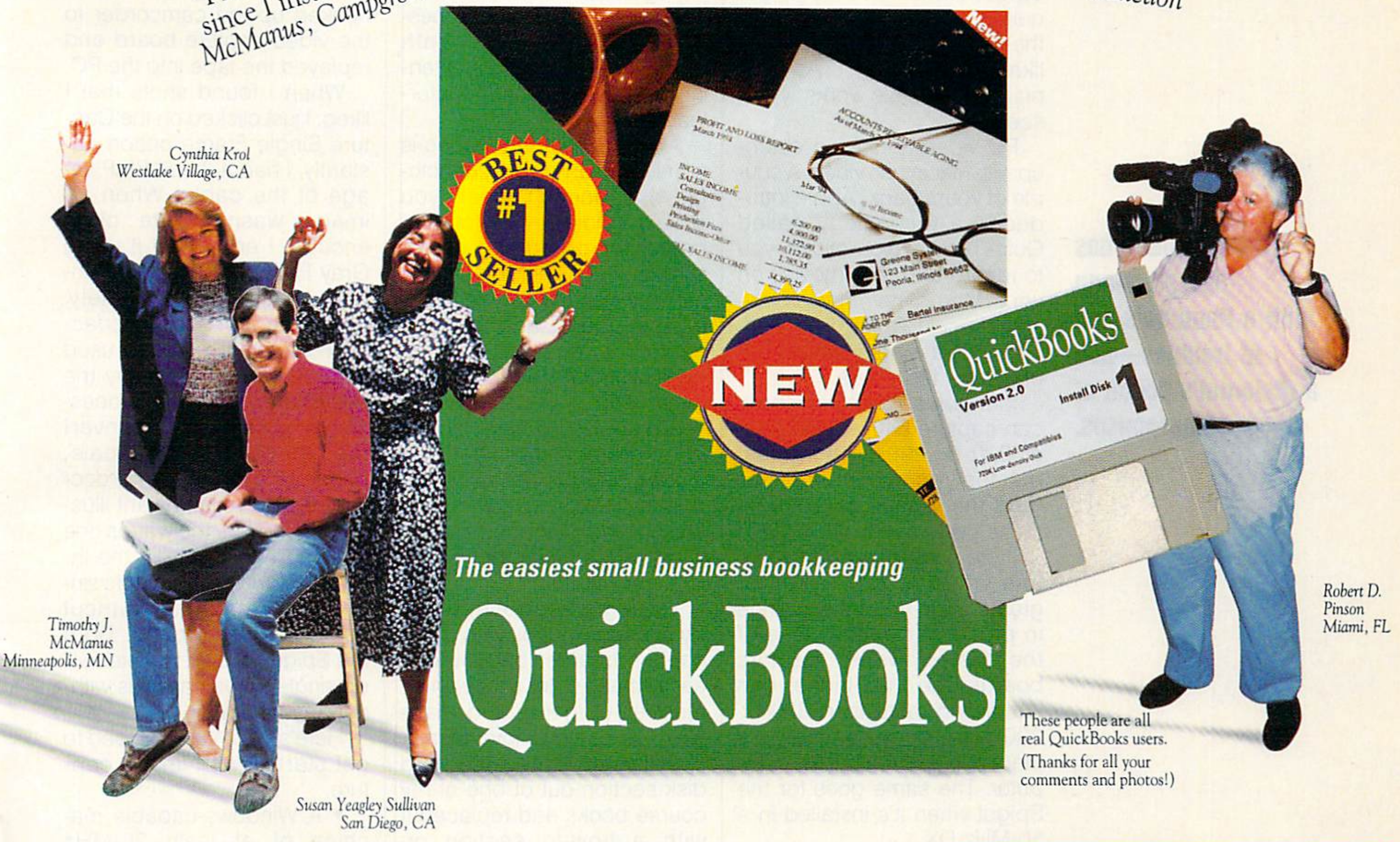

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HARDWARE CLINIC

Mark Minasi

Windows video has arrived, along with a Pandora's box of troubles—and a diplomat's pouch of compromises.

WINDOWS VIDEO

This month, I'm reporting on my experience with the new Video for Windows capture boards and recording software.

Since January I've worked with the Creative Labs Video Blaster, the Supermatch Video Spigot (which has been acquired by Creative Labs), and the Intel Indeo. Of the three, I like the Spigot best. As I explain how all this works, you'll see why.

PC video is playing catch-up with Macintosh video. A couple of years back, Apple introduced a technology called QuickTime, which allows you to record and play movies on your Mac. The images are small—most QuickTime movies run in a window about 160 pixels by 100 pixels.

Many video capture boards can capture 640- × 480-pixel or 320- × 200-pixel videos, but the recommended size (and the default on some of these systems) is 160 × 100.

If you need to be able to capture video at 320 × 200 or greater size, you'll pay a price in processor speed. One of the fastest video capture boards, the Intel Indeo, can handle no more than 320- × 200-pixel capture when it's placed in a 66-MHz DX2 computer. The same goes for the Spigot when it's installed in a 50-MHz DX.

Is 320 × 200 good enough? It's better than 160 × 100. But there's a significant trade-off between the size of each screen and the number of screens captured per second. At 160 × 100 pixels, the boards can capture up to 25 screens per second. At 320 × 200 pixels, the speed drops to about 15 screens per second. To perceive a series of still pictures as smooth action, the human eye needs to see them at a rate of at least 32 screens per second.

At higher resolutions, the problem becomes even more bothersome. I've tried capturing 640 × 480 screens, but even at speeds as low as five screens per second, the boards couldn't keep up.

Despite its problems, animation at 320 × 200 is good enough to serve as an accompaniment to a stored voice message. The files store both voice and video; their extension is AVI (Audio/Video Interleaved).

Although Windows video is admittedly an early technology, that doesn't mean you should ignore it. I've found it useful for producing digital still pictures. I deliver technical seminars on PC troubleshooting, support, and maintenance. I develop course books filled with advice, warnings, and anecdotes. For years the books have lacked photographs. My staff includes people with excellent drawing skills, and drawings often get the point across, but sometimes nothing but a photograph will do.

You'll get heartburn if you try to create videos with these capture boards, but you can easily make color stills with almost all of them—and that's why I've come to love them.

I recently ripped the hard disk section out of one of my course books and replaced it with a how-to section on SCSI. Anyone who's used SCSI knows that one of the most annoying things about it is the profusion of cable types in the SCSI world. Believe it or not, you hook up two SCSI devices with any one of four different kinds of cables, depending on what the maker of the SCSI peripheral felt like using. Most SCSI host adapter boards have connectors for two of those cable types. Before you venture to link together a daisychain of SCSI peripherals, you should know what connectors to look for. What's the best way to include pictures of the cable types and some common adapters? Digital stills.

Using a regular video camcorder, I walked around my office, borrowing cables and shooting them from different camera angles. Then I hooked up the camcorder to the video capture board and replayed the tape into the PC.

When I found shots that I liked, I just clicked on the Capture Single Frame option. Instantly, I had a 24-bit BMP image of the cable. When an image wasn't quite clear enough, I enhanced it using Gray F/X, a terrific image enhancer (with, unfortunately, one of the worst user interfaces in the world). Then I used Paint Shop Pro, probably the best shareware image processor for Windows, to convert the image to gray scale, popped the image into my document, and voilà! Instant illustration. This, by the way, is one reason that I don't like the Intel Indeo board. It won't do single-frame captures without some fiddling around. Both the Spigot and the Blaster will do single-frame captures without any trouble.

Here's what you will need to get started with image capture.

- A Windows-capable machine of at least 25-MHz speed (486 preferred)
- RAM of 8MB–12MB for most capture boards (16MB is actually bad for most capture boards—see below)
- At least a 256-color capability for video under Windows, 16-million-color (24-bit) capability preferred
- Plenty of available hard disk space for capture
- A video capture board
- Some source of VHS or Super VHS video signals (either a VCR or a camcorder)
- A Windows-compatible

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sound board (optional)

It's a hefty list, but it's not as bad as it looks. Let's start with the PC. It should have a fair amount of CPU horsepower because of the volume of data running through it. You can use a 386, but this is one case where having a 486 will really pay off in speed of execution.

You'll need a video board capable of working with a lot of colors, or at least a lot of grays. The number of colors you'll see is determined by your video board and the kind of video driver you use. Drivers for 256 colors are common these days, so if you've got Super VGA, use the 256-color drivers.

Screen resolutions above VGA's 640 × 480 are not necessary, and they'll slow down the capture process unnecessarily, so use 640 × 480 with 256 colors as your video mode when working with video capture. The next step up for many video boards is a 16-million-color (24-bit) mode. You can live without a 24-bit mode, but there will be times when you'd like to have it, so keep the drivers around (if your board can use them). You won't use the 24-bit mode most of the time because, as you'd expect, it slows processing speed. Under no circumstances should you try to do Windows video capture with a 16-color board.

For the best video speed, look for a video accelerator—one that interfaces via local bus, if possible. Although video speed is important, it seems that no video is fast enough to satisfy the Microsoft Video for Windows program. Every time you start it up with a new video driver, it runs a speed benchmark on the video board and always finds it lacking. Even what may be the fastest Windows video available (an ATI VLB Mach 32) was deemed too slow for Video for Windows. I have concluded that there's just no satisfying this program.

When you buy a disk drive for use with Windows video, buy more than you think you'll need. I once recorded ten minutes of normal VHS video, only to find that it took up 160MB of disk space. Not everything is going to take up that much space, but 3.75MB for each second of recording will convince you to keep your videos brief.

Now that I've told you to buy the most computer that you can lay your hands on, you might expect that I would proceed to recommend lots and lots of RAM, but surprisingly, many video capture boards will not work if you have 16MB or more.

Most video boards are overlay boards. They contain 1MB of RAM, which is used to store data, and they must share that 1MB with the CPU. It's the primary vehicle for communication between video capture boards and the CPU. This megabyte of RAM must sit somewhere in

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the memory address range below the 16MB mark.

Most 386DX and 486DX clones only offer memory expansion options of 4MB, 8MB, 16MB, 20MB (possibly), and 32MB. But if your machine has 16MB or more of RAM, there isn't any room for the megabyte on the video capture board. As a result, you're limited to 8MB as a maximum amount of memory. True, some major-brand computers offer 12MB because of their proprietary memory structures, but that's not a heck of a lot better than 8MB. It's ironic that you need a Windows Ferrari in order to do video capture, but when it comes to RAM, you're a pedestrian.

This memory debacle is another reason to love the Spigot. It doesn't have one of those silly memory buffers. All it needs is an 8K area that fits somewhere between 640K and 1024K, which is child's play to configure (at least when you compare it to the other alternatives). The Indeo has similar requirements, but it seems to have some undocumented use of memory that causes it to conflict with other boards; I've spent many an afternoon laboring to make my Intel Indeo board work with my Intel Express 32 Ethernet card.

Once you've got the right machine, you need the right input signals. Most video boards will accept either VHS or Super VHS signals as input. A Super VHS source is a better choice, as it provides higher-quality input—or does it? As it turns out, the question of improved resolution is relevant only on tape playback. If you're piping the camera's output straight into the capture board, it doesn't matter whether you've got an 8-mm, VHS, or Super VHS camera. An inexpensive VHS camera will do as well for direct input as a more expensive camera. So, you can save some money on your input device.

A much better way to spend your money would be to acquire a VCR with an above-average pause capability. That makes it easier to extract a single frame from a sequence. Although capture boards are generally able to grab single frames on the fly, it's nice to have a rock-solid picture on the screen to capture. If you don't have a good pause, you can still get a good motionless video image by putting your camera on a tripod and taking about two minutes of video of a motionless subject.

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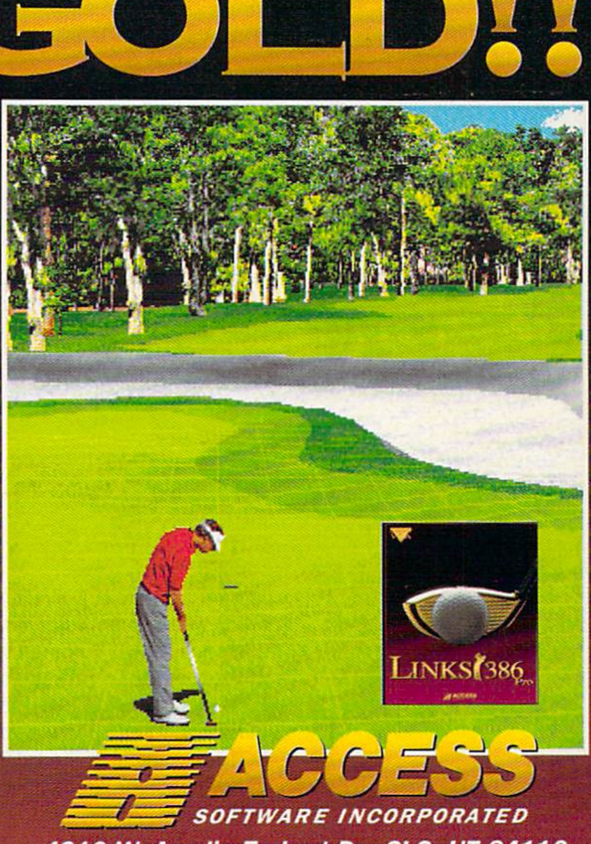

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TIPS & TOOLS

Edited by Richard C. Leinecker

Inserting nonkeyboard characters the easy way and bringing a little UNIX to DOS

Simple Blocks

"Tips & Tools" in the October 1992 issue contained a technique for embedding an ASCII character 255 in a subdirectory so that someone couldn't casually enter the subdirectory and look around.

It's a major pain to use the numeric keypad to create these directories and enter them. That's why I created three batch files—MDD, RDD, and CDD—that create and use these extended directories. (Please note that CDD is an internal 4DOS command. If you are using 4DOS, give this command a different name.)

Use them only when you want security. Just use the command MDD instead of MD, the command RDD instead of RD, and the command CDD instead of CD. You won't be able to name directories with extensions, since the extension is where the ASCII character 255 is embedded.

Where you see <Alt+255> in the listings, you should hold down the Alt key while typing 255 on the numeric keypad. When you release the Alt key after typing in the value 255, a blank character will be inserted into the batch file. You won't be able to see this character, but it'll be there protecting your directories. Here is MDD.BAT.

```
@ECHO OFF
IF "%1"=="" GOTO USAGE
SET TMPSUB=%1.<Alt+255>
MD %TMPSUB%
GOTO END
:USAGE
ECHO This creates a directory
ECHO with a non-ASCII character
ECHO embedded in it. You can
ECHO type only eight characters
ECHO and no extension. The
ECHO non-ASCII character is
ECHO embedded in the extension
ECHO portion of the directory
ECHO name.
GOTO END
:END
SET TMPSUB=
```

Here is RDD.BAT.

```
@ECHO OFF
IF "%1"=="" GOTO USAGE
SET TMPSUB=%1.<Alt+255>
RD %TMPSUB%
GOTO END
:USAGE
ECHO This removes a directory
ECHO with a non-ASCII character
ECHO embedded in it. You can
ECHO type only eight characters
ECHO and no extension. The
ECHO non-ASCII character is
ECHO embedded in the extension
ECHO portion of the directory
ECHO name.
GOTO END
:END
SET TMPSUB=
```

And finally, here is CDD.BAT.

```
@ECHO OFF
IF "%1"=="" GOTO USAGE

SET TMPSUB=%1.<Alt+255>
CD %TMPSUB%
GOTO END
:USAGE
ECHO This enters a directory with
ECHO a non-ASCII character
ECHO embedded in it. You can
ECHO type only eight characters
ECHO and no extension. The
ECHO non-ASCII character is
ECHO embedded in the extension
ECHO portion of the directory
ECHO name.
GOTO END
:END
SET TMPSUB=
```

RICHARD C. LEINECKER
REIDSVILLE, NC

Remove Multiple Files

I work with DOS and UNIX, and the UNIX rm (remove) command should have been included with DOS. It deletes several files (or file groups) at once.

To use it, you just type *rm* followed by the files you want to delete. If you wanted to delete all of the EXE files that start with *R*, as well as the TXT files , you'd type *rm r*.exe *.txt*. Here's a batch file that gives you the rm command in DOS. Put it somewhere in your path, and use it anywhere. Its name is RM.BAT.

```
@ECHO OFF
IF "%1"=="" GOTO USAGE
IF "%1"=="/?" GOTO USAGE
:START
IF "%1"=="" GOTO END
REM Remove ECHO Y |from the
REM following line if you want to
REM be prompted for each
REM wildcard delete.
ECHO Y |DEL %1
SHIFT
GOTO START
:USAGE
ECHO This batch file deletes
ECHO the files (or file groups).
ECHO Wildcards are allowed.
ECHO Example: RM *.TXT
 R*.EXE
:END
```

PARIN KADAKIA
REGO PARK, NY

Disable Break

In the January 1992 issue, you published a tip that gave four lines to add to the AUTOEXEC.BAT file for computer security. This works fine unless someone knows that pressing Ctrl-Break will abort the batch file.

To fix this loophole, you can redirect the input and not let the batch file try to abort. All you have to do is add the line CTTY NUL before the four lines and the line CTTY CON after the four lines.

Here's my version.

```
CTTY NUL
:START
IF EXIST B:KEY.BAT GOTO
 END
GOTO START
:END
CTTY CON
```

MICHAEL L. MARTIN
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More time and recovering from hard disk disaster

More Time

Here's one more way to get your computer to print the time without stopping to request the correct time. These programs, QTIME.COM and QDATE.COM, simply get the time and date and print it on the screen.

You can type these files in using the DOS Debug command. Make sure the DOS program called Debug is in your path or the current directory. In these examples, the italic text is what the computer prints; the roman text is what you should type. One way to be sure you get these programs exactly right is to have someone read the numbers to you as you type them in. Another way suggested by one of our readers is to read the numbers into a tape recorder and then play them back as you enter the program code.

```
debug qtime.com
File not found
-e 100 b4 09 ba 74 01 cd 21 b4
-e 108 2c cd 21 8a c5 3c 0c 7e
-e 110 08 2c 0c c6 06 85 01 70
-e 118 90 d4 0a 80 c4 30 04 30
-e 120 8b d0 86 d6 80 fa 30 75
-e 128 02 b2 20 b4 02 cd 21 8a
-e 130 d6 cd 21 b2 3a cd 21 8a
-e 138 c1 d4 0a 80 c4 30 04 30
-e 140 8b d0 86 d6 b4 02 cd 21
-e 148 8a d6 cd 21 b2 3a cd 21
-e 150 b4 2c cd 21 8a c6 d4 0a
-e 158 80 c4 30 04 30 8b d0 86
-e 160 d6 b4 02 cd 21 8a d6 cd
-e 168 21 b4 09 ba 85 01 cd 21
-e 170 b4 4c cd 21 43 75 72 72
-e 178 65 6e 74 20 74 69 6d 65
-e 180 20 69 73 20 24 61 24
-RCX
CX 0000
:87
-W
Writing 0087 bytes
-Q
```

If you run the Checksum program (the most recent version of Checksum was published in "Tips & Tools" in the July 1993 issue) on QTIME.COM, the number 15164 will appear on your computer screen.

```
debug qdate.com
File not found
-e 100 b4 09 ba 69 01 cd 21 b4
-e 108 2a cd 21 8a c6 d4 0a 80
-e 110 c4 30 04 30 8b d0 86 d6
-e 118 80 fa 30 75 02 b2 20 b4
-e 120 02 cd 21 8a d6 cd 21 b2
-e 128 2f cd 21 b4 2a cd 21 8a
-e 130 c2 d4 0a 80 c4 30 04 30
-e 138 8b d0 86 d6 b4 02 cd 21
-e 140 8a d6 cd 21 b2 2f cd 21
-e 148 b4 2a cd 21 81 e9 6c 07
-e 150 8a c1 d4 0a 80 c4 30 04
-e 158 30 8b d0 86 d6 b4 02 cd
-e 160 21 8a d6 cd 21 b4 4c cd
-e 168 21 43 75 72 72 65 6e 74
-e 170 20 64 61 74 65 20 69 73
-e 178 20 24 24
-RCX
CX 0000
:7b
-W
Writing 007b bytes
-Q
```

If you run the Checksum program on QDATE.COM, the number 14344 will appear.

BRADLEY M. SMALL
GREENSBORO, NC

What Do You Do?

Recent problems with my PC have forced me to take a crash course in computer crashes. What do you do if everything fails? There are some steps that you can follow. First, you should always be prepared. Make sure you have a complete backup and an emergency boot disk that contains your current AUTOEXEC.BAT and CONFIG.SYS files as well as FDISK.COM and FORMAT.COM. To help recover, you should also have a printout of your Setup screen. To get the printout, go to Setup, turn on your printer, and press the Print Screen key. If you have advanced setup screens, also do printouts of these. Keep your emergency boot disk up-to-date and put it and your Setup printouts in an envelope beside your computer. If you lose the envelope, make a new emergency kit immediately.

When you discover that you can't boot from or access your hard disk, you'll be prepared. Boot from your emergency floppy, go to Setup, and compare the contents of the Setup screen to your printouts. Make any necessary changes, and try rebooting from your hard disk.

If your hard disk still won't respond, turn off your computer, pull the plug, and pull your boards, one by one. Press all the chips on the boards, pull and immediately replace all of the jumpers (pulling the jumpers and replacing them will ensure there is good contact), and gently rub a pencil eraser on the contacts of the board along the edge that goes into the expansion-bus slot. Pull and immediately replace all cables. Then try rebooting from your hard disk again.

If you still can't boot, Fdisk and Format /s your hard disk. Run Spinrite or some other diagnostic software to make sure all of your bad sectors are marked. If the computer still won't boot from the hard disk, it's time to call a technician. There's probably something wrong with the disk mechanically or electrically.

ROBERT BIXBY
GREENSBORO, NC

If you have an interesting tip that you think would help other PC users, send it along with your name, address, and Social Security number to COMPUTE's Tips & Tools, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. For each tip we publish, we'll pay you $25–$50. All tips submitted become the property of General Media International. ❐

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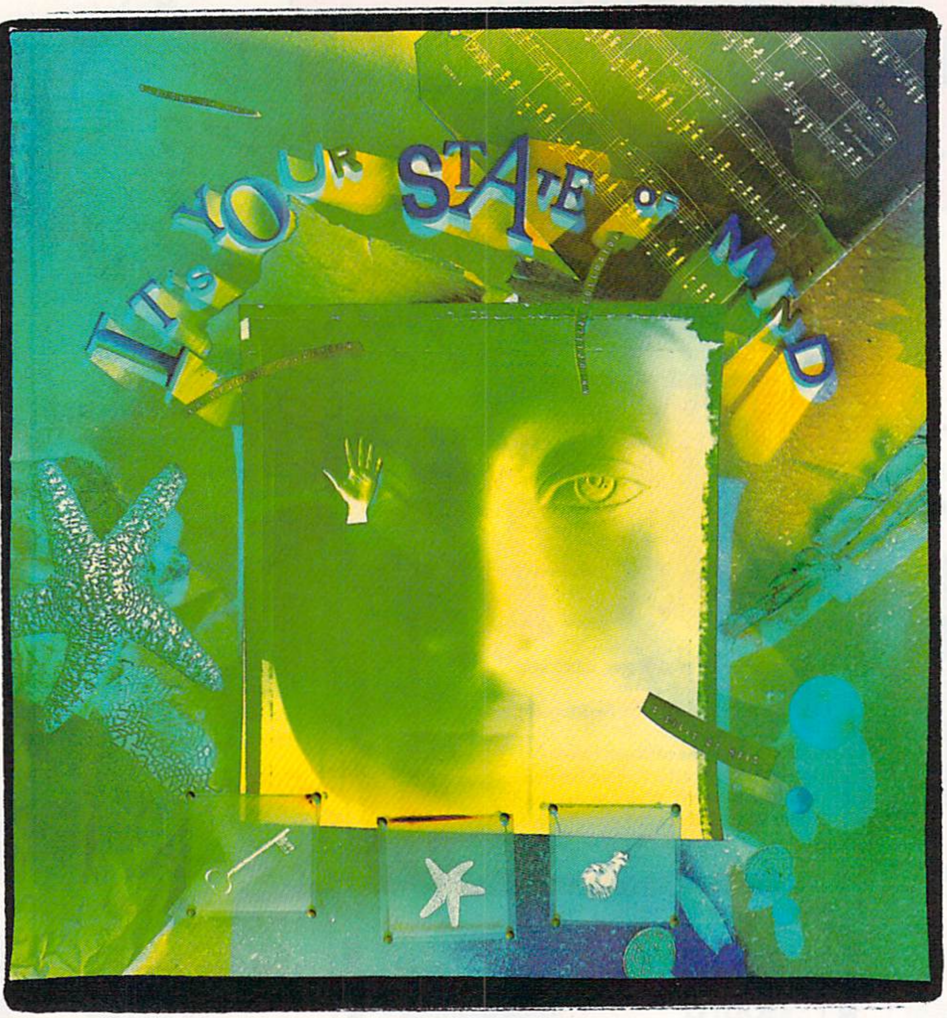
It's Your State of Mind

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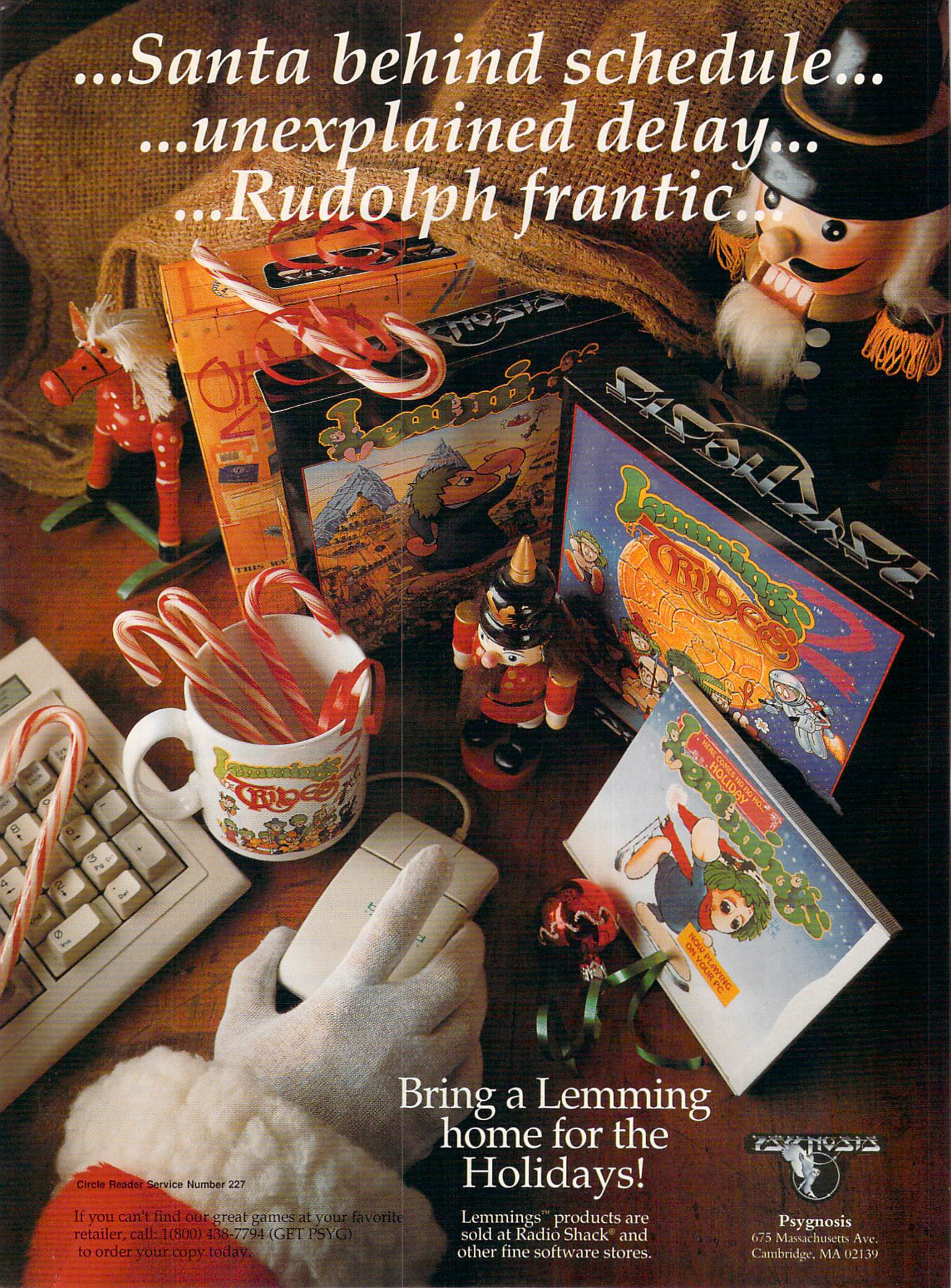
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BIRTH OF A
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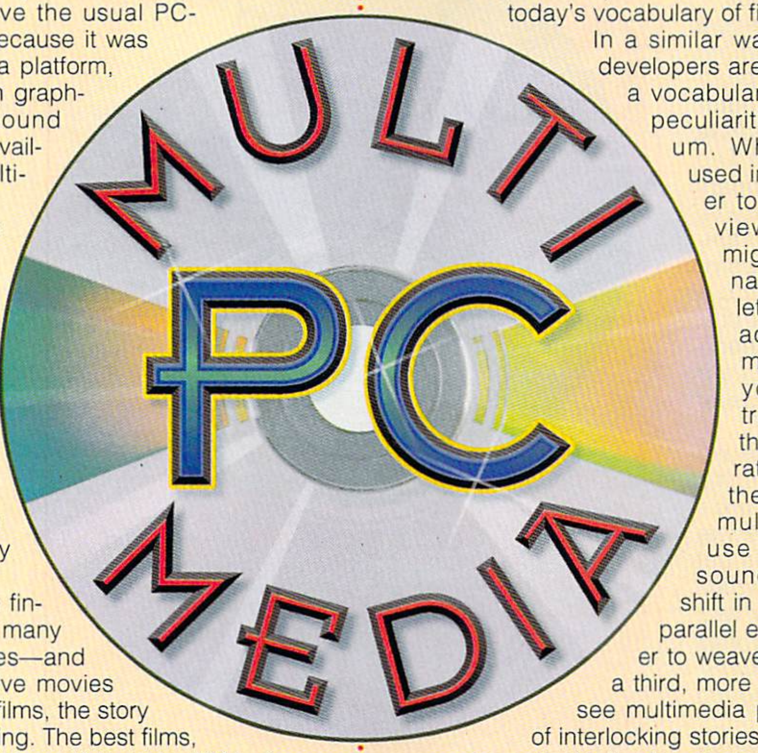
NEW ART FORM?

BY DAVID ENGLISH

Recently, I had a stimulating talk with Bob Able, who might best be described as a new-media maven. He developed his craft in both commercial and documentary films (his experience includes working with Stanley Kubrick on the star gate sequences for *2001: A Space Odyssey* and with David Wolper on the award-winning "Making of the President" television series).



More recently, he headed the large team of creative artists and programmers that created the most impressive multimedia title I've ever seen. It's called Columbus: Encounter, Discovery and Beyond. Columbus stands head and shoulders above the usual PC-based multimedia titles. Because it was created for IBM's Ultimedia platform, it features higher-resolution graphics and higher-quality sound than have generally been available with MPC-based multimedia titles.

What does Able see as the future of multimedia? Not surprisingly, he views the possibilities of multimedia through the eyes of a filmmaker. He stresses that full-motion video is technically just around the corner, yet we haven't learned how to combine the art of narrative with the tools of the medium. No one knows how to tell a story in multimedia.

I think Able has put his finger on what's wrong with many of today's computer games—and where these new interactive movies might lead us. In narrative films, the story and characters are everything. The best films, such as Welles's *Citizen Kane*, Kubrick's *2001: A Space Odyssey*, Gance's *Napoleon*, Eisenstein's *Potemkin*, and Kurosawa's *The Seven Samurai*, use technique to tell the story. *Kane*'s flamboyant editing and composition, *2001*'s stark realism, *Napoleon*'s emotionally charged camera movements, *Potemkin*'s dynamic editing, and *Samurai*'s restrained lyricism serve the story's narrative line, help create the story's tone, and further the development of the characters.

While many of today's multimedia games dazzle us with their fluid motion (The 7th Guest), imaginative graphics (Spaceship Warlock), and photorealistic characters (Hell Cab), we're still in the early stages of developing a vocabulary for the new medium.

As a student in the Department of Cinema Studies at New York University, I attended a fascinating series of courses on D. W. Griffith. Each semester, we looked at a single year of Griffith's work. As we viewed the films in chronological order, we could see Griffith try different techniques, such as closeups, tracking shots, and parallel editing (two similar stories told simultaneously). Griffith would never use these techniques for their own sake—they would always be used to serve the story. During those early years, Griffith developed these techniques until he had refined much of today's vocabulary of filmmaking.

In a similar way, today's multimedia developers are attempting to develop a vocabulary that grows from the peculiarities of their new medium. Whereas a closeup is used in film to bring you closer to a character's point of view, multimedia artists might use the interactive nature of the medium to let you choose the character's personality that most closely resembles your own. Whereas a tracking shot opens up the space of a film narrative and signals where the story will soon lead, multimedia artists might use three-dimensional sound to signal a similar shift in direction. And whereas parallel editing allows a filmmaker to weave two similar stories into a third, more complex story, we may see multimedia products with a variety of interlocking stories that the viewer can run chronologically, by character, or by location (as opposed to simply having three alternate endings).

Able has shifted his energies from film to multimedia because he instinctively believes in the potential of multimedia. Hundreds of creative people have chosen a similar path for the same reason. It took 30 years for film to develop into a true art form, but I'm betting that this time things will move much faster. We're on the verge of having software titles with full-screen, full-motion video—by the year 2000, the medium should be firmly in place. With people such as Bob Able trying to figure out what makes multimedia tick, we may be witnessing the birth of the twenty-first century's greatest art form. ❑

50 Great Multimedia Gift Ideas

BY DAVID ENGLISH, PHILLIP MORGAN, AND LISA YOUNG

It's been a great year for multimedia. Sound cards and CD-ROM drives are selling so fast that stores can't keep them on the shelves. Level 2 MPC upgrade kits (with 16-bit sound cards and double-speed CD-ROM drives) have pushed down the prices of Level 1 upgrade kits to less than $400. The trickle of CD-ROM software has turned into a flood of titles. In short, multimedia products are in demand, and they make great gifts.

While we've refrained from including the most expensive multimedia products, such as fully equipped multimedia PCs ($1,500 and up) and The Oxford English Dictionary on CD-ROM ($895), we've also refrained from cramming in lots of inexpensive but useless multimedia products. If you're not prepared for the sticker shock, you might pool your resources with friends or family members.

It'll be worth it—despite the expense. Imagine the delight on your loved one's face when that strange oblong package turns out to hold a pair of stylish multimedia speakers, or that tiny flat box—which was sure to be an audio CD—turns out to be a top-selling multimedia title.

To simplify things, we've divided the 50 products into three basic categories: multimedia hardware, CD-ROM software, and disk-based multimedia software.

Multimedia Hardware

1. Sound Blaster Digital-Edge CD. If you've waited to upgrade your PC to a multimedia PC, you're in luck. Now you can upgrade to a higher standard. Creative Labs offers a multimedia upgrade kit that meets the new Level 2 MPC specifications. The $999 package includes a Sound Blaster 16 ASP, a double-speed multisession CD-ROM drive, The Software Toolworks Multimedia Encyclopedia, Microsoft Bookshelf, Macromedia Action!, a microphone, and speakers. Creative Labs, (408) 428-6600.

2–3. Fusion Double CD-16 and Pro 16 Multimedia System. Media Vision has two Level 2 upgrade kits. The Fusion Double CD-16 ($799 external, $699 internal) includes a Pro Audio-Spectrum 16 sound card, a double-speed NEC CD-ROM drive (model 55J), and four CD-ROM applications (Compton's Interactive Encyclopedia for Windows, Battle Chess Enhanced, Arthur's Teacher Trouble, and The 7th Guest). The Pro 16 Multimedia System ($1,199) includes a Pro Audio-Spectrum 16 sound card, a double-speed NEC CD-ROM drive (model 84JD-1), and eight CD-ROM applications (Compton's Interactive Encyclopedia for Windows, Battle Chess Enhanced, Mantis, Civilization, Macromedia Action!, Mayo Clinic Family Health Book, PC Karaoke, and Where in the World Is Carmen Sandiego? Deluxe). Media Vision, (800) 348-7116.

4–5. Sonic Sound. Suddenly, DSPs (Digital Signal Processors) are showing up in sound cards and fax/data modems. The 16-bit Sonic Sound sound card uses its DSP for General MIDI wave table synthesis (32 simultaneous stereo instruments) and—with an upgrade option—extended MIDI and speech recognition. The basic package also includes Sound Blaster and Ad Lib support, as well as connectors for SCSI CD-ROM, MIDI, and joystick. Diamond Computer Systems; (408) 736-2000; $299 for Sonic Sound, $129 for the upgrade option.

6. Maestro 16vr. If you like to play games, check out the 16-bit Maestro 16vr sound card, which also uses a DSP for voice recognition and General MIDI instrument sounds. You receive a special voice recognition version of Interplay's Star Trek: 25th Anniversary, along with the usual Sound Blaster and Ad Lib support; connectors for SCSI CD-ROM, MIDI, and joystick; and utility software. This version lets you control the game with verbal commands, which you give using the provided microphone headset. Computer Peripherals, (805) 499-5751, $299.

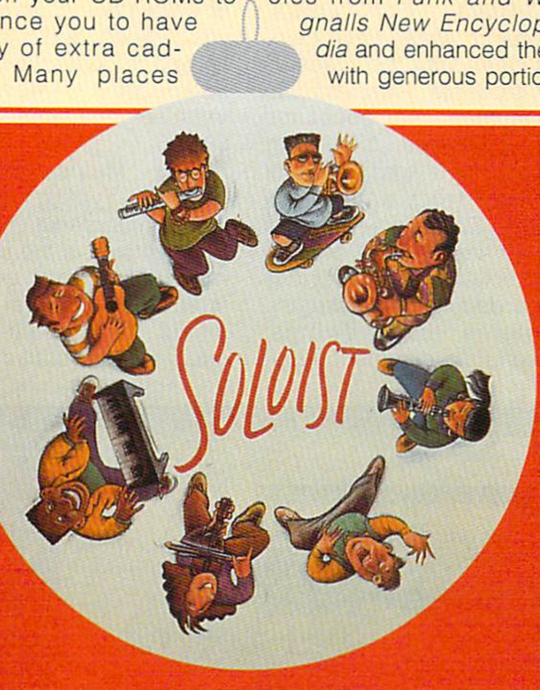
7–9. Hello! Music!. Looking for a plug-and-play MIDI upgrade for your sound card? Consider Hello! Music! ($449.00). It includes an external General MIDI module that you can hook up to your computer's MIDI interface or serial port, as well as a selection of MIDI software from Passport (Trax, a MIDI sequencer program; MIDI Player, a MIDI jukebox program; and QuikTunes, a collection of preprogrammed MIDI tunes). Optional accessories include the CBX-K3 49-key MIDI keyboard ($299.95) and the CBX-S3 powered monitor speakers ($399.95). Yamaha, (714) 522-9011.

10–12. A pair of multimedia speakers. What would multimedia be without a good set of speakers? They should be magnetically shielded so you can place them on either side of your computer screen and self-powered so you don't have to rely on your sound card's inferior amplifier. Yamaha (714-522-9011) sells an excellent pair for $149, called the YST-M10. For a top-of-the-line sound, check out the Altec Lansing Multimedia ACS-300 (Altec Lansing Consumer Products, 800-258-3280, $400 a pair) and the Power Partner 570 (Acoustic Research, 800-969-2748, $475 a pair).

13. Extra CD-ROM caddies. You can never have too much money or too many caddies. If you have young kids around, it's a good idea to keep your most frequently used CD-ROMs in their own caddies. There's nothing like trying to scrape peanut butter and jelly off your CD-ROMs to convince you to have plenty of extra caddies. Many places charge $10 or more for a caddy, but if you shop around, you can find them for $5 or less.

CD-ROM Software

14. Microsoft Encarta Multimedia Encyclopedia 1994 Edition For Windows. Microsoft has taken the articles from *Funk and Wagnalls New Encyclopedia* and enhanced them with generous portions of photographs, audio, video, and animation. The program's interface makes it easy to find your way through this huge amount of information. You can explore events chronologically, geographically, or conceptually, or you can search for associated ideas using the nine categories and 84 subcategories. Microsoft, (800) 426-9400, $395 ($99 until December 31st).

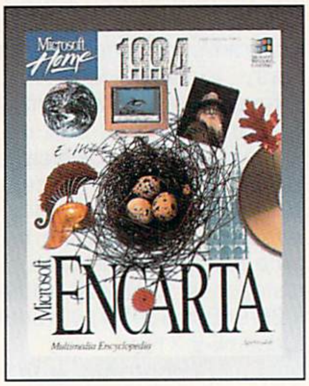


This year, create some real excitement. Give a multimedia gift.

15. Compton's Interactive Encyclopedia for Windows. This new CD-ROM version of Compton's Encyclopedia uses images, maps, graphs, audio, and video to make the text come alive. One new feature lets you store open windows as a virtual workspace. Compton's NewMedia; (619) 929-2500; $395 for CD-ROM version, $498 for combined CD-ROM and printed version.

16. The New Grolier Multimedia Encyclopedia. Make learning fun for yourself and your children with the latest version of this multimedia encyclopedia. Video, animation, sound, and a raft of color and black-and-white Super VGA images bring the excitement of CD-ROM technology to the complete text of The Academic American Encyclopedia. Grolier Electronic Publishing, (800) 356-5590, $395.

17. Microsoft Dinosaurs. Get detailed descriptions of the lives of 80 dinosaurs and dozens of other prehistoric creatures with nearly 200 articles and more than 1000 illustrations and photographs. With hot-linked text to connect you to more than 800 pop-up windows, you can explore the material at your leisure or take a series



Microsoft Encarta (number 14)

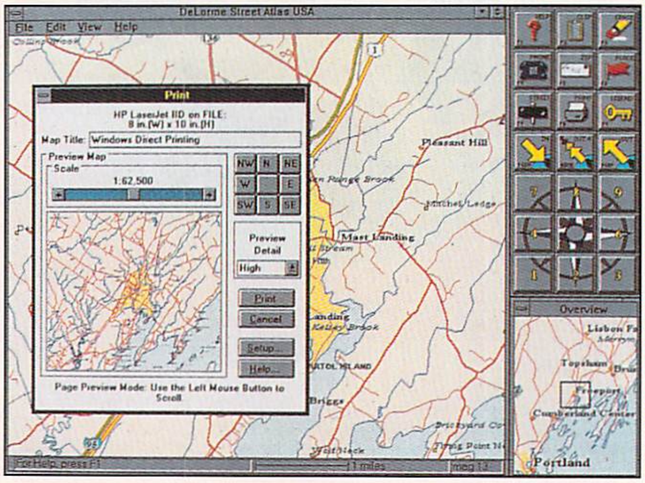
of guided tours. Microsoft, (800) 426-9400, $79.95.

18. The Animals!. Visit the San Diego Zoo in the comfort of your own home. You and your child can explore all of earth's biomes to learn about familiar and exotic animals in their natural habitats. This single CD-ROM is packed with 82 videos, 1300 color pictures, 2500 pages of text, and 2 1/2 hours of sound data. The Software Toolworks, (800) 234-3088, $119.95.

19. Microsoft Cinemania '94 Interactive Movie Guide For Windows. Search for your favorite movie titles, actors, and directors with this top-selling CD-ROM film reference. Cinemania includes all 19,000 capsule reviews and ratings from Leonard Maltin's *Movie and Video Guide*, thousands of entries from *The Motion Picture Guide* and *The Encyclopedia of Film*, and movie stills and audio clips from major motion pictures. Microsoft, (800) 426-9400, $79.95.

20. SI CD-ROM Sports Almanac. With 26 categories of sports information, this title from *Sports Illustrated* can satisfy the most voracious stats appetite. It's a compilation of 1991 stats, awards from 1931 to the present, obituaries, profiles, and dozens of *SI* articles. It also lists year-by-year records for each sport. Sports Illustrated, (800) 593-6334, $59.95.

21. Monarch Notes on CD-ROM. For years, *Monarch Notes* have helped demystify the classics for students. Now you can have the entire collection on a single CD-ROM. Search for a word, name, or phrase from any of the nearly 200 titles—many of which are long out of print. The collection also includes recorded voice passages, pictures, and drawings. Bureau Development, (201) 808-2700, $99.



Street Atlas USA from Delorme Mapping (number 22)

22. Street Atlas USA. Browse through the streets of your youth without leaving home. Street Atlas USA uses the U.S. Census Bureau's TIGER files to map every street in the country. You can search by ZIP code, telephone number, or street name. Delorme Mapping, (207) 865-1234, $169.

23. Mayo Clinic Family Health Book. More than just a book on CD-ROM, this layman's health reference is an impressive use of multimedia. The program gives you the complete text of the 1400-page book, hundreds of color photos, animation, voice, video, and hypertext. Its text is nontechnical but thorough. Interactive Ventures, (612) 686-0779, $99.95.

24. Mavis Beacon Teaches Typing: Version 2.0 for Multimedia. The CD-ROM version of the top typing program adds digitized speech and digital audio music. Multimedia Mavis offers verbal dictation of ten prerecorded letters and lets you add your own. There's also a self-running overview and demonstration of the program. The Software Toolworks, (415) 883-3000, $99.95.

25. Fractal Ecstasy. View the amazing patterns that make up fractal images. The program includes fractal fly-throughs, over an hour of Video for Windows movies, and more than a thousand full-screen fractal images. Create your own fractals with the program's Fractal Creator, which works with 30 different fractal-generating formulas and 125 different color palettes. Deep River Publishing, (207) 871-1684, $49.95.

26. Nautilus. This CD-ROM magazine offers traditional bulletin board information enhanced with CD-quality pictures, music, animation, and film clips. You can also use Nautilus to establish two-way access with Metatec's own online service, which is similar to CompuServe and GEnie. Along with the typical magazine material, you'll receive shareware, freeware, fonts, programming tips, and utilities. Metatec Discovery Systems; (614) 761-2000; $9.95 for a single disc, $119.40 for a 12-disc subscription.

27. The 7th Guest. This is the first CD-ROM game too large to fit on a single disc (it ships on two). Realistic video-generated characters, high-resolution 3-D–rendered backgrounds, and an excellent musical score make this computer game seem like an interactive movie. Solve the logical puzzles as you move through a haunted mansion in search of clues. Virgin Games, (714) 833-1999, $99.99.

28. Hell Cab. This ultraphotorealist game features state-of-the-art 3-D graphics, sound effects, and music. The plot involves a New York City cab driver (he's really a devil trainee), prehistoric jungles, Nero's

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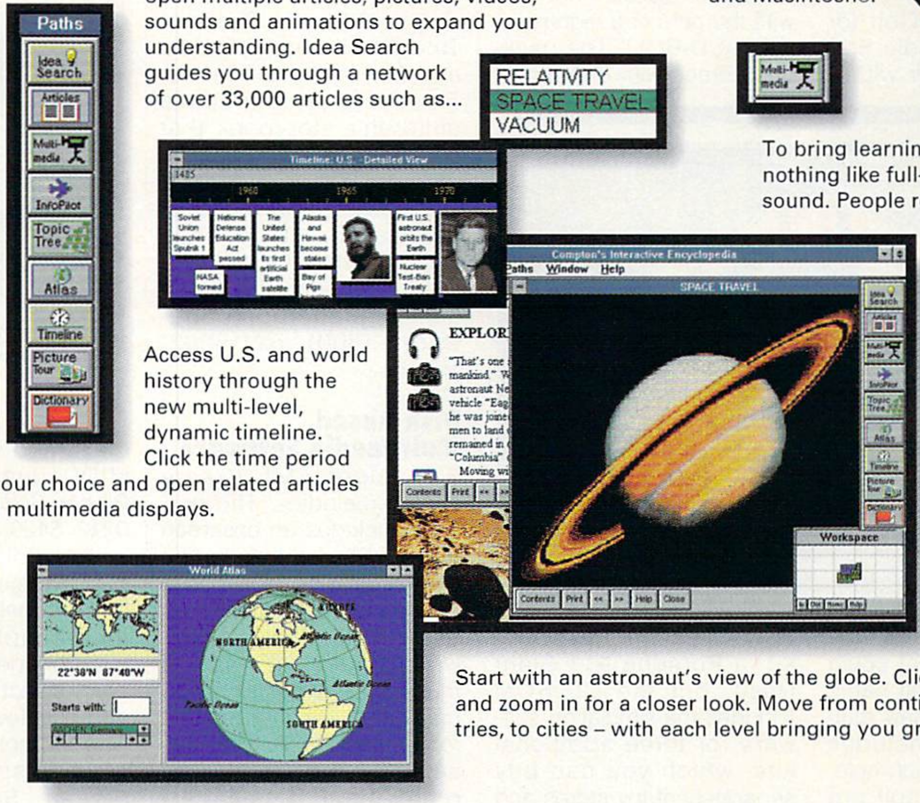
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1485
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1965
1970
Soviet Union launches Sputnik 1
National Defense Education Act passed
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NASA formed
Bay of Pigs
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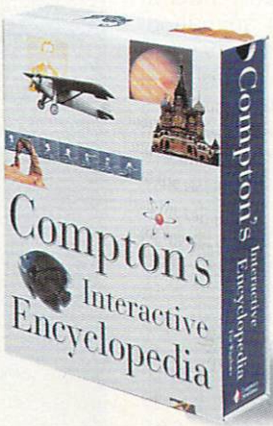
Compton's Interactive Encyclopedia
Compton's Interactive Encyclopedia

Circle Reader Service Number 240

W 100 WINDOWS MAGAZINE

1993 MULTIMEDIA WORLD READERS' CHOICE WINNER

COMPTON'S NEWMEDIA
2320 Camino Vida Roble
Carlsbad, CA 92009 (800) 826-2206

COMPUTE CHOICE AWARDS

NEWMEDIA INVISION MULTIMEDIA AWARDS 1993 SILVER MEDAL

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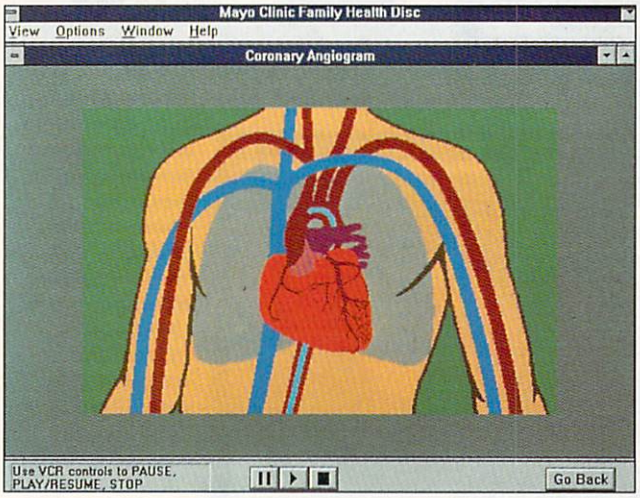
Rome, and the trenches of World War I. Your goal is to make it back to the airport with your soul intact. Time Warner Interactive, (800) 593-6334, $99.99.

29. Microsoft Golf for Windows, Multimedia Edition. For the golfer with a CD-ROM drive, what could be better than a golf game on CD-ROM? The new multimedia version includes video "flybys" of each hole, a personal video golf pro who offers advice for each hole, and video demonstrations of swinging and aiming techniques. The program is compatible with the many Links Championship Courses from Access. Microsoft, (800) 426-9400, $64.95.


Mayo Clinic Family Health Disc
View Options Window Help
Coronary Angiogram
Use VCR controls to PAUSE, PLAY/RESUME, STOP
Go Back

Mayo Clinic Family Health Book (number 23)

30. King's Quest VI. In this latest release in the King's Quest series, King Alexander attempts to rescue Princess Cassima from the evil Vizier. He travels among a mysterious set of islands, whose lush graphics were hand-painted and then scanned into a computer for the look of a storybook. The CD-ROM's spoken dialogue and text also enhance the game. Sierra, (800) 326-6654, $79.95.

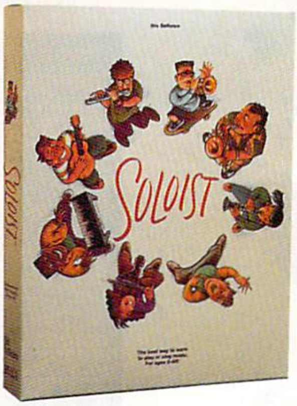
31. European Racers. Build your plastic model car with the help of a high-resolution CD-ROM. The package comes with one model kit, a Porsche 911 Slant Nose, but the CD-ROM includes the simulation software for three additional kits, which you can buy separately at toy stores and hobby shops. The program shows your model rendered in 3-D–polygon animation, provides step-by-step assembly instructions, and includes a racing track where you can square off against five onscreen competitors. Revell-Monogram, (708) 966-3500, $69.95.

32. Just Grandma and Me. This interactive children's storybook helps your child explore language and learn to read while having fun. Accompanying Grandma and Little Critter to the beach, your child can choose the Read to Me button to watch the animation and listen to the story, or choose the Let Me Play button to interact with the characters. Brøderbund Software, (800) 521-6263, $69.95.

33. Arthur's Teacher Trouble. Like Just Grandma and Me, Arthur's Teacher Trouble is an interactive children's storybook that combines animated effects, musical accompaniment, and narration in a choice of languages. It teaches young readers (ages 6–10) as it entertains with subtle humor. Brøderbund Software, (800) 521-6263, $59.95.

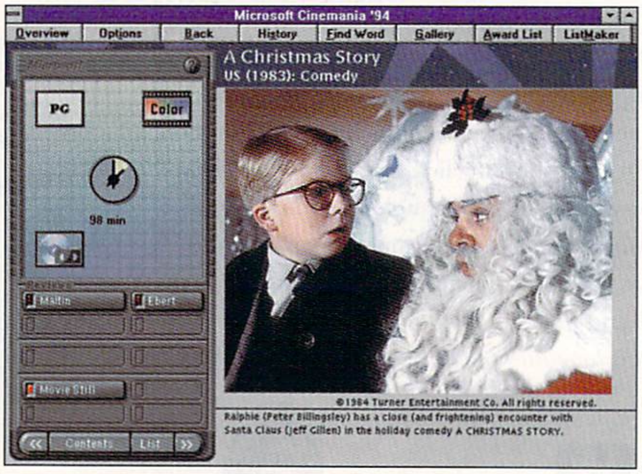
Disk-based Multimedia Software

34. SuperJAM!. Create instant melodies. The program includes an onscreen piano keyboard that can be controlled with your mouse or computer's keyboard; an Eas-O-Matic MusicMaker, which makes it easy to make musical decisions; 30 musical styles that include rock, pop, dance, classical, samba, and jazz; and ready-made musical arrangements and chord progressions. SuperJAM! is appropriate for both beginner and experienced musicians and works with any MIDI instrument. Blue Ribbon Software, (404) 315-0212, $129.



Soloist (number 35)

35. Soloist. This computer game makes it easy to learn melodic sight-reading. Simply hook up a microphone to your sound card, select your instrument and skill level, and play or sing the notes that the program displays on your screen. Soloist doesn't



©1984 Turner Entertainment Co. All rights reserved.

Ralphie (Peter Billingsley) has a close (and frightening) encounter with Santa Claus (Jeff Gillen) in the holiday comedy A CHRISTMAS STORY.

Microsoft Cinemania '94 Interactive Movie Guide (number 19) require MIDI, offers 36 levels of play, and includes a chromatic tuner to help you tune your instrument. Works with any musical instrument—even your voice. Ibis Software, (415) 546-1917, $59.95.

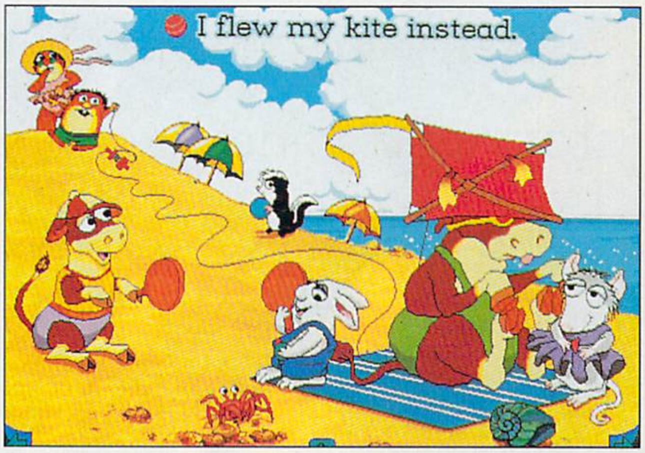
36–42. A Sound Source Unlimited sound clip package. Sound Source Unlimited offers a variety of popular sound clips to liven up your Windows environment. Each package ships with a utility that lets you associate sounds with your Windows system functions, such as startup, shutdown, General Protection Error, and application launch. Current collections include Star Trek ($59.95), Star Trek: The Next Generation ($59.95), 2001: A Space Odyssey ($59.95), Terminator 2: Judgment Day ($47.95), Total Recall ($47.95), Star Wars ($37.95), and The Wizard of Oz ($37.95). Sound Source Unlimited, (800) 877-4778.

43. *Sound Blaster: The Official Book.* Pamper your Sound Blaster with a book of its own. This paperback includes tips and tricks to enhance playback and recording, as well as a troubleshooting guide that shows you how to resolve joystick difficulties, interrupt conflicts, and volume problems. You also get a 3 1/2-inch disk with dozens of sound files, dozens of songs and musical jingles, and several popular Sound Blaster utilities. Osborne McGraw-Hill, $29.95.

44. The Turtle Tools for Multimedia. Looking for an inexpensive way to get into digital audio, MIDI, and CD audio? Take a look at The Turtle Tools for Multimedia. It includes WaveTools, an audio-recording, -editing, and -playback application; Midisoft Session, a MIDI sequencer; KeyPlayer, a program that lets nonmusicians play and record music using just the computer keyboard; Sound-Attach, a utility that lets you attach WAV and MIDI files to Windows system functions; and SoundBank, a CD-ROM with over 300 sound effects in five different formats. Turtle Beach Systems, (717) 843-6916, $89.

45–46. A professional-quality sound-editing program. Sound-editing packages such as Wave for Windows 2.0 (Turtle Beach, 717-843-6916, $149) and Sound Forge 2.0 (Sonic Foundry, 608-256-3133, $179) let you alter sounds in ways that recording studios would have killed for just 10 or 15 years ago. We're talking about high-quality stereo recording direct to your hard drive, with cut-and-paste editing and nondestructive digital effects, such as echo, reverb, flange, fade, reverse, volume, and pan.

47. The Norton Speedrive. If your CD-ROM drive can't keep up with your CD-ROM programs, you might need a software cache for your drive. DOS's SMARTDrive doesn't cache CD-ROM drives, but The Norton Speedrive does. For owners of Level I MPC and subMPC CD-ROM drives, it may be the least expensive way to keep up with today's more demanding CD-ROM programs. Symantec, (800) 441-7234, $99

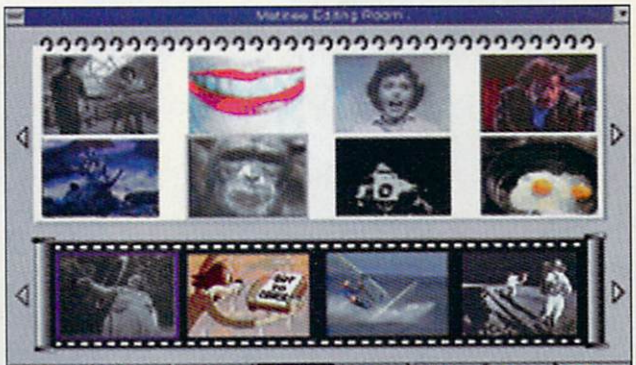

I flew my kite instead.

Brøderbund 's Just Grandma and Me (number 32)

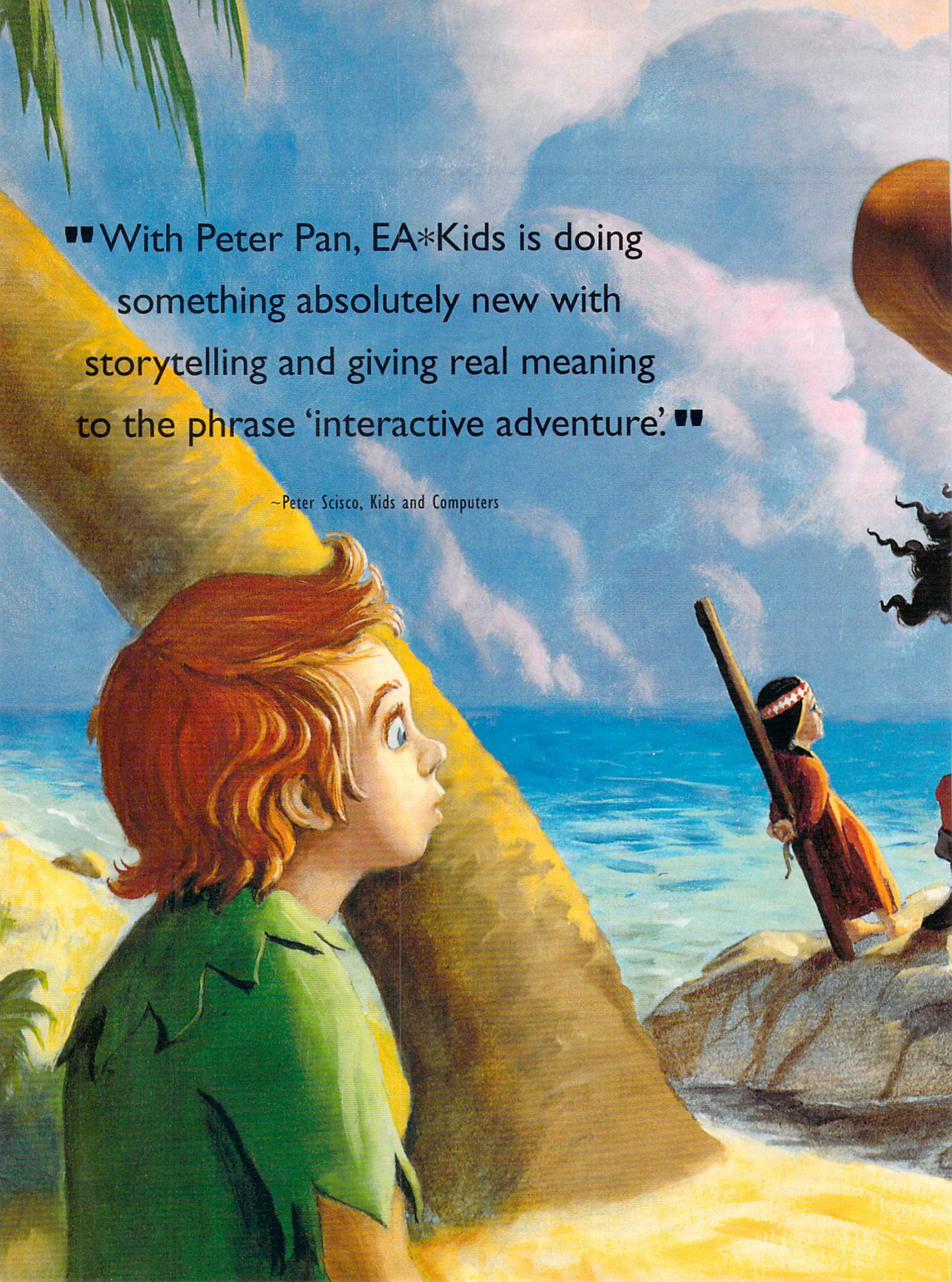
48. Netroom 3. Are your multimedia drivers taking up so much memory you don't have room for your programs? Netroom 3 loads your sound card, CD-ROM, software cache, network, and other device drivers into upper memory—leaving as much as 630K for your applications. The latest version adds a cloaking technology that can move your System and Video BIOS into extended memory. Helix, (718) 392-3100, $99.

49. Matinee. This is the first screen saver to bring full-motion video to your PC. The disk-based version ($49.95) features 38 clips, including monsters, cartoons, go-go dancers, and killer sharks. The CD-ROM version ($59.95) includes over 250 video clips in categories ranging from bikinis to sci-fi. Access Softek, (510) 848-0606.

Only 49 multimedia gift ideas? Don't forget a subscription to COMPUTE (COMPUTE Publications, 800-727-6937, $12.97 for 12 issues). With our new multimedia section and regular multimedia coverage in the rest of the magazine, you'll be fondly remembered throughout the coming year.❑

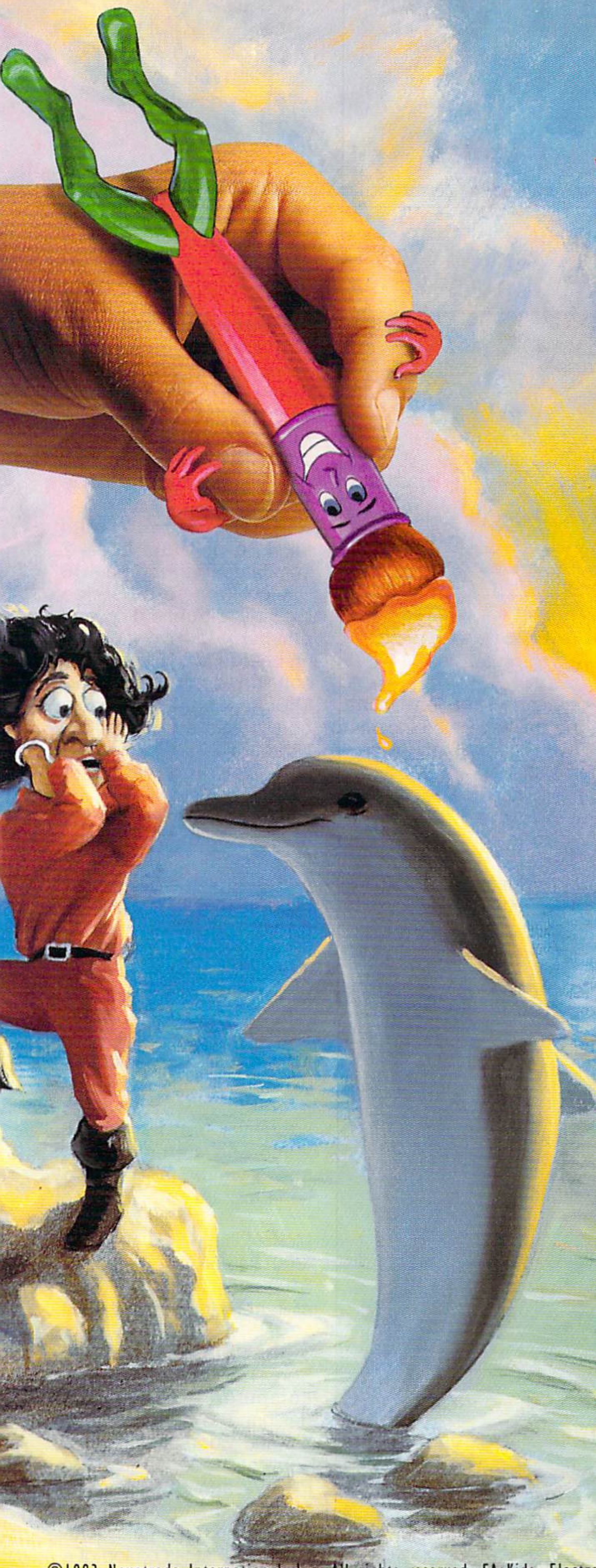


Matinee from Access Softek (number 49)



“With Peter Pan, EA*Kids is doing something absolutely new with storytelling and giving real meaning to the phrase ‘interactive adventure.’”

~Peter Scisco, Kids and Computers



Peter Pan
EA*Kids

Remember the sense of wonder you felt as you watched Peter Pan discover he could really fly? Well, in Peter Pan, A Story Painting™ Adventure from EA*Kids,™ it's your child's imagination that really soars. Boys and girls ages 5-9 become the "hands of the animator," to help Peter save Wendy from the evil Captain Hook. Along with the Paintbox Pals,™ children actually change events in the story, expanding their reading, problem-solving and decision-making skills like never before.

It's the kind of fun your children will return to again and again. Unless of course, you're playing it yourself.

To order a FREE EA*Kids demo disk or videotape call 1 800 KID-XPRT.

For IBM® compatibles, Macintosh® and 3DO.® Available on floppy disk and CD-ROM.

EA*Kids™

THE KIDS SOFTWARE EXPERTS

Circle Reader Service Number 165

SALLY
JAZZ
WINSTON
NICK

(Actual computer screen shot)

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NEW MULTIMEDIA PRODUCTS

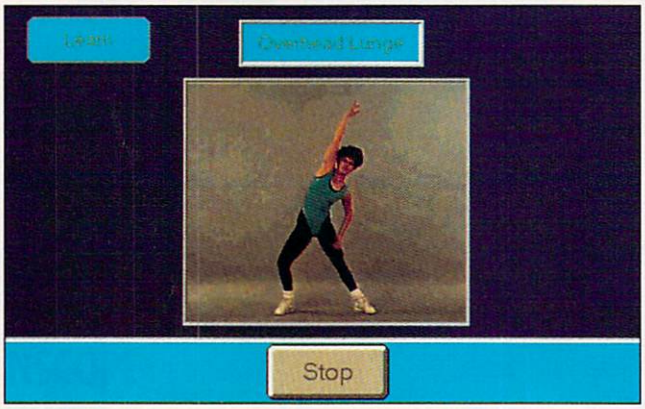
EDITED BY LISA YOUNG

Clear the Floor

Instead of going to the gym, you can now just turn on your computer for a personalized aerobics workout. Fitness Partner, released by Computer Directions, develops customized workouts based on your weight-loss or muscle-toning goals.

The CD-ROM compiles your workout from 75 full-motion video exercises and includes video and audio instruction from Roni Smaldino, an IDEA-certified aerobics instructor. Fitness Partner can design as many as nine personalized routines for ten different users. The program also electronically tracks seven different measurements and goals for each person.

You can design your own routine by mixing and matching the 75 exercises, setting the speed and number of repetitions for each movement, and choosing your favorite music. If you're unfamiliar with a particular exercise, you can use the learning mode to find out how to perform a movement.



Get in shape with the Fitness Partner CD-ROM.

Computer Directions
(209) 435-5777
$69.95
Circle Reader Service Number 530

New Entry-Level Multimedia PC

If you've been thinking about buying an entry-level multimedia computer, this could be the time to do it. Radio Shack has introduced the Tandy Multimedia Personal Computer, a fully equipped 80486-based multimedia PC priced at less than $1,600.

The package includes a Photo CD–compatible CD-ROM drive, a Sound Blaster Pro 8-bit audio card, Super VGA graphics, 4MB of RAM (expandable to 64MB), a 130MB SmartDrive hard disk, and two 16-bit expansion slots.

The Tandy Multimedia PC ships with several multimedia programs, including The Animals!, The Software Toolworks World Atlas, Toolworks Reference Library, and America Online. The package also includes DOS 6, a multimedia version of Windows 3.1, and a multimedia version of Microsoft Works for Windows.

Radio Shack
(817) 390-3011
$1,599
Circle Reader Service Number 531

The Tandy Multimedia Personal Computer from Radio Shack

No More Sacrifice

Why should you have to settle for an 8-bit sound card just to save money? With Media Vision's Pro Audio 16 Basic, you can add CD-quality sound to your computer for less than $200.

Compliant with both MPC Level 1 and Level 2 standards, the Pro Audio 16 Basic offers 16-bit stereo digital audio recording and playback to 44.1 kHz, an on-board FM synthesizer, a software-controlled mixer, MIDI support, and a game port. It also supports DOS, Windows 3.1, Windows NT, OS/2 2.1, and NextStep, and it's compatible with the Pro AudioSpectrum 16, Sound Blaster, and Ad Lib sound cards.

The Pro Audio 16 Basic package includes DOS and Windows software, including Media Vision's Pocket Tools (which allows recording, editing, and mixing under Windows 3.1), Dinosaur Adventure from Knowledge Adventure (which lets you explore the prehistoric era of dinosaurs through full-motion video and stereo sound), and a QuickStart installation program.

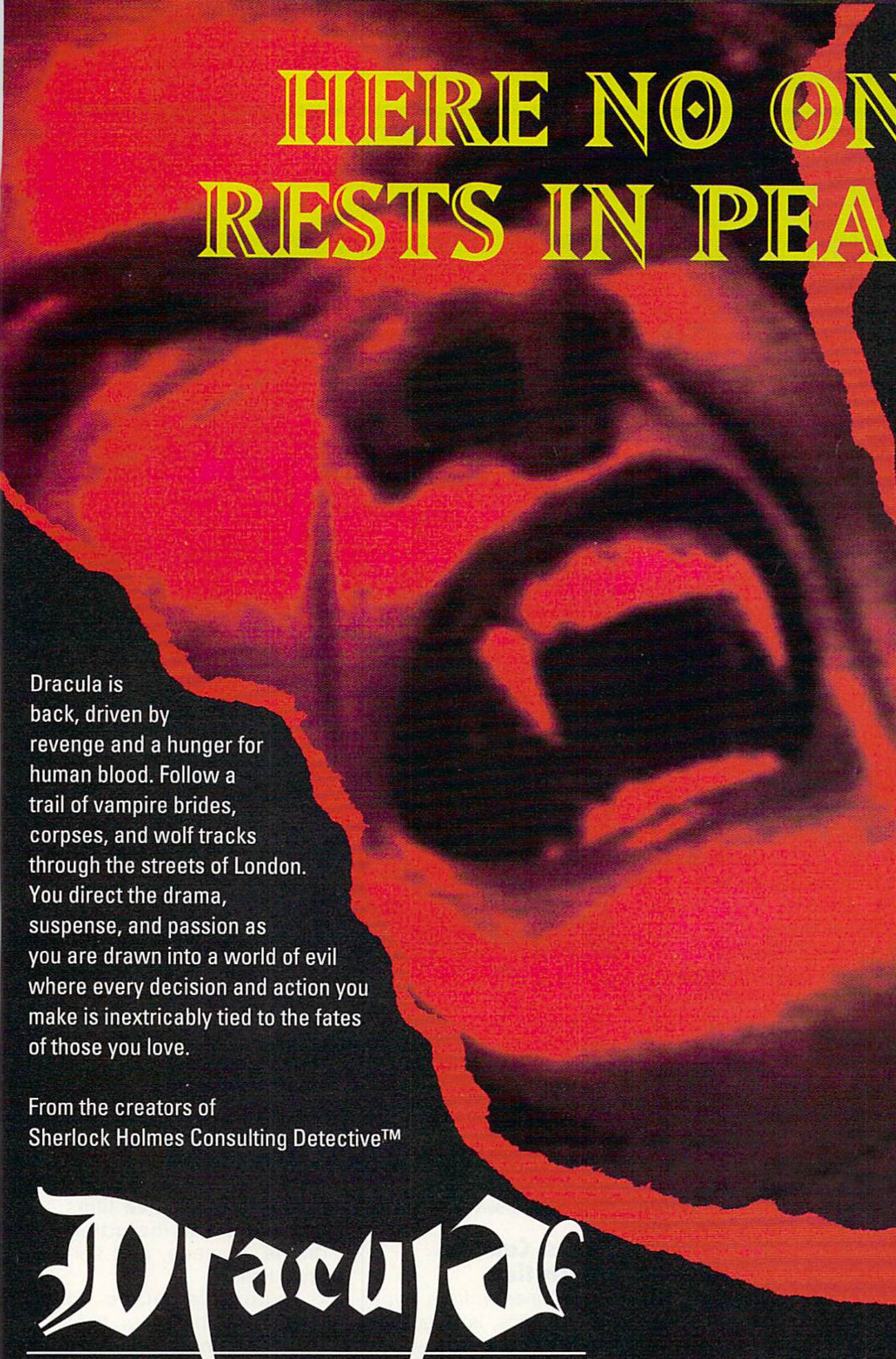
Media Vision
(800) 845-5870
$199
Circle Reader Service Number 532

Sight and Sound

Sony has introduced two computer peripherals designed to bring multimedia and video conferencing applications to the PC. The PCS-V2 and PCS-V4 combine audio and video components into a single compact unit that fits on top of a

INTERACTIVE HORROR MOVIE

HERE NO ONE RESTS IN PEACE.



Over 90 minutes of captivating video and an original gothic soundtrack draws you into the center of the action.

Over 150 riveting scenes propel you down multiple pathways toward the final confrontation.

Unique interactive experience that you've never encountered before.

Dracula is back, driven by revenge and a hunger for human blood. Follow a trail of vampire brides, corpses, and wolf tracks through the streets of London. You direct the drama, suspense, and passion as you are drawn into a world of evil where every decision and action you make is inextricably tied to the fates of those you love.

From the creators of Sherlock Holmes Consulting Detective™

Dracula UNLEASHED™

Contact your local retailer or call 1-800-877-4266.

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AVAILABLE ON CD-ROM FOR PC AND MAC

Circle Reader Service Number 219

NEW MULTIMEDIA PRODUCTS

Pro Audio 16 Basic

Pro Audio 16 Basic

desktop computer monitor.

Both products have a high-quality color video camera, unidirectional microphone, speaker, volume control, and audio mute switch. You can vertically adjust the camera and manually activate a privacy shutter to disengage the video capabilities. The PCS-V4 will be available with a full-duplex echo cancellation feature to reduce unwanted echo.

The PCS-V2 and the PCS-V4 work with most types of computers and can be networked in a number of ways. They can also function as audio and video input devices for other multimedia applications.

The PCS-V2 is scheduled to ship in November, while the PCS-V4 should be released sometime in 1994.

Sony
(201) 930-7194
$999—PCS-V2
Price TBA—PCS-V4
Circle Reader Service Number 533

Monitors That Sing

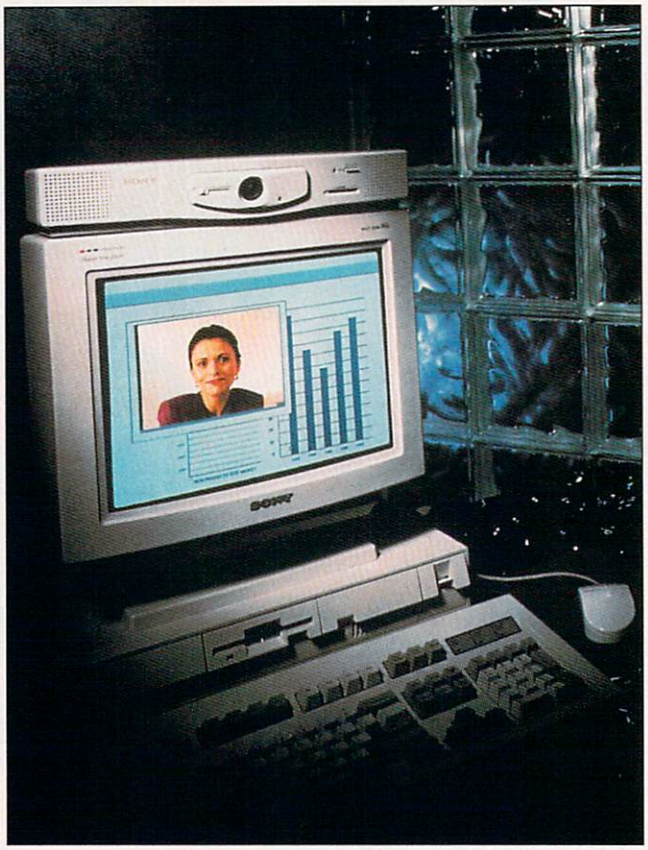
If you're looking for a monitor to use with multimedia and CD-ROM applications, consider the Brilliance 15, an autoscanning monitor with stereo audio capabilities built in.

The Brilliance 15 includes a stereo amplifier, speakers, headphone jack, and user-adjustable volume control. It has a maximum resolution of 1024 x 768 at 72 Hz. It also uses a 0.28-mm dot pitch, as well as a flat, square, black matrix tube for high contrast and brilliant color rendition.

Other high-performance display functions include Constant Vertical Raster, which automatically maintains the correct vertical image height for all display modes, and Advance Monitor Deflection Control, which allows fast, stable switching between display modes without disturbing transient distortion effects.

The Brilliance 15 is backed by a two-year parts-and-labor warranty and has a mean time between failures of 50,000 hours.

Phillip's Brilliance 15 Monitor



Sony's new PCS-V2 multimedia camera

Philips Consumer
Electronics
(800) 835-3506
$699
Circle Reader Service Number 534

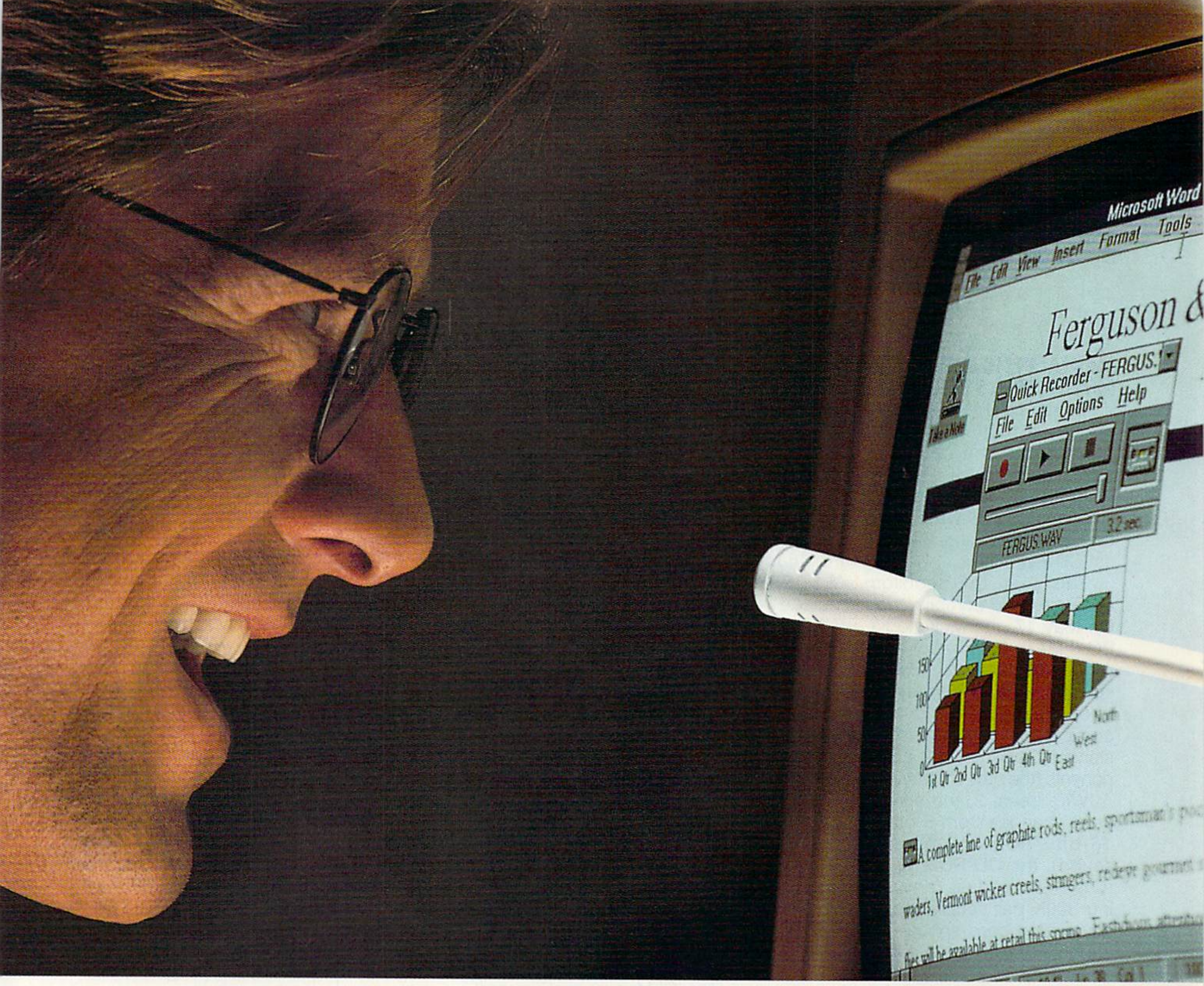
Lights, Camera, Interaction

VirtualCinema, from HyperBole Studios, is a technology that creates three-dimensional, interactive films on CD-ROM. It uses live actors, gives you a 360-degree perspective of the environment, and lets you peek into the minds of the characters. According to the company, you actually think the characters' thoughts and recall their memories.

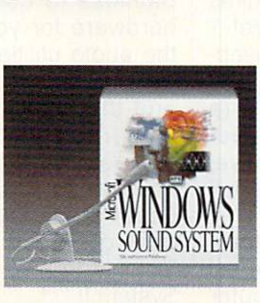
With VirtualCinema, you can go at your own speed, repeating sections or following interesting tangents. Several popular types of interactive films are planned, including drama, comedy, and science fiction.

HyperBole plans to begin shipping its first VirtualCinema product by Christmas, with more titles scheduled for release in 1994. ❑

HyperBole Studios
(206) 451-7751
Price TBA
Circle Reader Service Number 535


Microsoft Word
File Edit View Insert Format Tools
Ferguson &
Quick Recorder - FERGUS.
File Edit Options Help
Take a Note
FERGUS.WAV
3.2 sec.
150
100
50
0
1st Qtr 2nd Qtr 3rd Qtr 4th Qtr
East
West
North
A complete line of graphite rods, reels, sportsman's
waders, Vermont wicker creels, stringers, redeye gourmet

FIRST WE MADE WINDOWS. NOW IT'S TIME TO TALK.


Microsoft
WINDOWS
SOUND SYSTEM

With the new Microsoft® Windows™ Sound System, just tell your computer what you want it to do. You can customize your system to respond to your personal spoken commands. Even our new directional microphone knows exactly who you are.

This full set of audio software has lots of options, too. Spice up presentations with music or quotes. Or proofread numbers as the computer reads them back.

All for the price of a game.

You can also get this software with the sound board included. So go visit your nearest reseller to see what's creating all the conversation.

Microsoft

Making it easier

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MULTIMEDIA SPOTLIGHT

By David English

MEDIA VISION PRO 16 MULTIMEDIA SYSTEM II

It used to be easy to choose a multimedia upgrade kit. If the package had an MPC label, you knew the sound card and CD-ROM drive would be capable of playing the latest CD-ROM titles.

This year, the decision became more complicated. On May 17, the Multimedia PC Marketing Council announced its Level 2 MPC specifications. Now you have to choose between Level 1 components (the earlier standard) and Level 2 components (the new standard).

With Level 2, the sound card changes from 8-bit to 16-bit (for CD-quality sound), the CD-ROM drive runs twice as fast (delivering 300K per second), and your video card should be capable of displaying a resolution of 640 x 480 with as many as 65,536 colors (Level 1 requires only 640 x 480 with 16 colors). A Level 2 computer should be at least a 25-MHz 486SX with 4MB of RAM and a 160MB hard drive, while Level 1 calls for only a 16-MHz 386SX with 2MB of RAM and a 30MB hard drive.

As you can see from the Level 1 computer requirements, a change has been long overdue. Most CD-ROM software is already optimized for Super VGA (640 x 480 with 256 colors) and at least a 486SX processor. The latest titles that use Video for Windows and QuickTime for Windows video clips need Super VGA and a double-speed CD-ROM drive. Rather than leading the market, Level 2 simply reflects the demands of today's multimedia software.

Just one week after the MPC Marketing Council announced the Level 2 specifications, Media Vision introduced two Level 2 upgrade kits: the Fusion DoubleCD 16 ($699 internal, $799 external) and the Pro 16 Multimedia System II ($1,199 internal). Both include NEC double-speed CD-ROM drives—though the drive in the Pro 16 II kit has an access time of 250 milliseconds, while the drive in the Fusion kit has an access time of 350 milliseconds. The Pro 16 II kit also includes more bundled applications (eight rather than four) and more specialized audio software, such as a MIDI sequencing program, a professional audio editor and mixer, and a voice recognition program. The Fusion kit is designed for people on a budget who might be new to multimedia, whereas the Pro 16 II kit is designed for people who want to experiment with computer-based audio and are willing to pay more for higher-quality components.

Pro 16 system
MEDIA VISION

Pro 16 Multimedia System II

In this review, we'll look at the Pro 16 Multimedia System II. Its sound card is the improved Pro AudioSpectrum 16 with two output plugs—one for speakers (which uses the built-in amplifier) and one for an external amplifier (which bypasses the built-in amplifier). It's capable of CD-quality sound when sampling in stereo at the full 44.1 kHz, though you'll probably need a 486 to record cleanly at that rate. The card is well shielded and provides a clear sound with low background noise. It's compatible with games that support Sound Blaster and Ad Lib sound cards, it has joystick and SCSI connectors, and it has separate microphone and line input jacks. While external MIDI is supported, you'll have to buy Media Vision's MIDI Mate adapter to use it. The MIDI Mate converts the joystick connector into one joystick, one MIDI IN, one MIDI THRU, and two MIDI OUT connectors.

The CD-ROM drive is NEC's double-speed 84JD-1. It has the usual Level 2 throughput of 300K per second, has an exceptional access speed of 250 milliseconds (Level 2 requires 400 milliseconds; Level 1 requires only 1000 milliseconds), and is Photo CD multisession compatible (a Level 2 requirement). Because it's an internal drive, you'll need a free drive bay in your computer.

As I mentioned before, Media Vision has tailored this package for computer users who like to experiment with sound. Accordingly, you'll find a variety of powerful audio utilities, including separate DOS and Windows applications that let you record, play, and edit high-quality stereo sounds, and separate DOS and Windows applications that let you play your audio CDs. Other utilities let you compress and decompress audio files, control Windows programs with your voice, record and edit MIDI files, and convert text to spoken words.

As with many MPC upgrade kits, you'll also receive a generous bundle of CD-ROM software. The Pro 16 II kit includes Compton's Interactive Encyclopedia for Windows, Mayo Clinic Family Health Book, Where in the World Is Carmen Sandiego? Deluxe, Battle Chess Enhanced, Mantis, PC Karaoke, Macromedia Action!, and Civilization. Finally, you'll receive a disk-based multimedia presentation program, Action 2.5 for Windows.

This is quite a hardware and software package. The sound card and CD-ROM drive sound terrific and should easily handle today's more demanding Level 2 multimedia titles. The QuickStart installation software makes it relatively painless to configure the hardware for your system, the audio utilities are powerful and well selected, and the bundled applications represent an excellent value. If you're in the market for a high-quality Level 2 upgrade kit, you can't go wrong with Media Vision's Pro 16 Multimedia System II.

Media Vision
(800) 348-7116
$1,199

Compute Reader Service Number 550

BACKROAD
RACERS
POWER MODELER

Around here nice guys don't finish last - they don't even finish. Better know how to drive or Catfish Louie and company will take turns making your Backroad Racer a pile of twisted, burning wreckage. Then taunt you as you watch instant replays of your wipeouts. Video clips give hints and make threats while you try to outrun cops and race on four different tracks. Use 3-D animated instructions to build a model of your car so it's easier to identify the torched remains. Available for IBM on CD-ROM.

The model makes the game better. The game makes the model better.™

Video clips just like this one make the game extra bad. But in a good way.

After you build your car you can follow all traffic laws and be a safe & courteous driver.

{Of course, you could also go play an action-packed game of hopscotch with your sister.}

Circle Reader Service Number 135

BACKROAD RACERS™

PRODUCTIVITY CHOICE

If you're looking for an inexpensive page-layout program that outshines even the high-end DTP packages, this program is for you.

William Harrel

PAGEPLUS 2.0

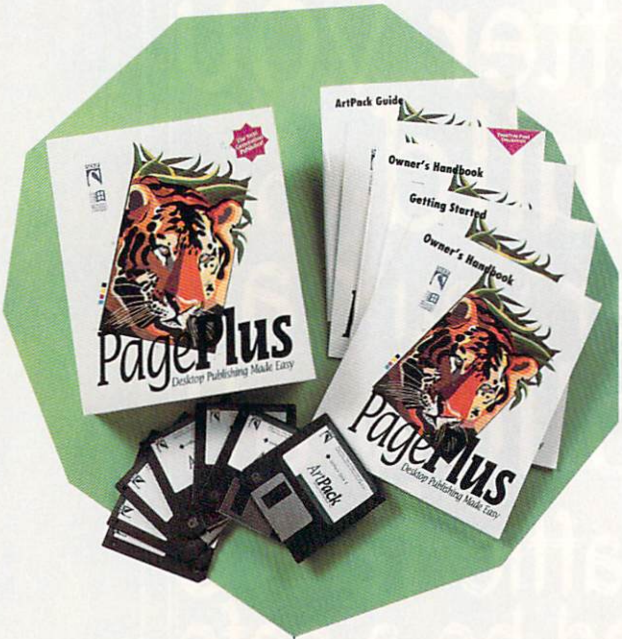
Serif's PagePlus consistently leads the other economy desktop publishing packages in useful features. Version 1.0 provided spot color separations when none of the developers of other under-$200 packages thought users needed them (but soon found out that users demanded them), and it supported full incremental text rotation at a time when you couldn't find it anywhere else, even in the high-end heavyweights, Ventura Publisher and PageMaker.

Version 2.0 again pushes PagePlus ahead of the competition with process color separations, a PANTONE color palette, drag-and-drop text, incremental graphics rotation, OLE support, and a nifty table editor.

This surprisingly powerful program makes page layout remarkably easy. An example is its versatile style sheets. Similar to the same feature in a word processor, style sheets let you format paragraphs or selected blocks of text by simply assigning a predefined style tag to them.

Some other low-end page-layout packages don't support style sheets, and creating long documents with their many different text formats is entirely too much work. Some high-end DTP programs, such as Ventura Publisher and Frame Maker, have style sheets, but you need a lot of perseverance and tenacity to define and use their style sheets. PagePlus 2.0 simplifies the process by doing away with a zillion options most people don't use.

Also impressive is the text frames feature. It makes it a snap to jump text to different sections of a document, such as different pages in a newsletter. You can also export the document elements you create in PagePlus as a graphics file and import them into other applications, a feature not found in other layout packages. You could, for example, create an ad or a graphic in PagePlus and include it in a WordPerfect document, such as a business proposal.



ChangeBar is another winning feature. It lets you easily assign colors, borders, and other attributes by clicking on icons. ChangeBar is context-sensitive, meaning that it changes to accommodate the currently selected tool. When you select the Text tool, for example, icons and text boxes for changing fonts, point size, and alignment are displayed. You can't beat PagePlus's ChangeBar for convenience.

The rulers are now movable. You can drag them like a T square anywhere in the document window to measure and resize elements. If you want to draw a six-inch line, for example, you can pull down the rulers to measure it. The ability to pull the rulers into your layout greatly enhances your ability to achieve precession. High-end DTP and draw programs have supported this option for a while; it's nice to find it in an economy package.

OLE support lets you keep your documents current by upgrading imported elements as they change in the source applications, and the Table Editor (a slick little program that puts PageMaker's utility of the same name to shame) is OLE-aware; you can edit your tables from inside PagePlus by simply double-clicking on them. You can also keep objects pasted from other programs, such as a Lotus spreadsheet chart, current automatically. With OLE, each time the chart changes, it's updated in your layout.

While this program is loaded with high-end features, the ability to create process color separations is one of the more significant. With this option, you can import color graphics and photographs into your layouts and separate them on a high-resolution imagesetter. You can then use the resulting cyan, magenta, yellow, and black (CMYK) plates on a four-color printing press to produce full-color documents. You can also create spot color separations, which consist of color elements strategically placed throughout a document, such as a company logo in a newsletter.

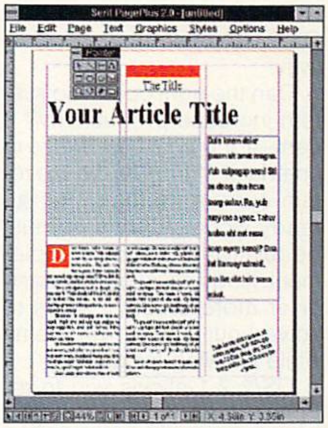
Few programs—especially applications in this price range—offer this level of power. Some high-end products, such as FrameMaker and the top Windows word processors (all of which claim DTP prowess) still do not support color separations. And the few that do, such as Ventura Publisher, are not as good at it as PagePlus. Ventura, for example, doesn't separate CMYK TIFFs (TIFF 6.0), which are quickly becoming the industry standard. Not only does PagePlus make color separations easy (just select Process Separations in the Print dialog box), but the entire procedure, including creating PostScript print files for printing at the neighborhood service bureau, is explained in PagePlus's Help files.

Still not convinced? For another $40 you can buy the PagePlus BumperPack, which includes TypePlus, ArtPack, and FontPack, along with the basic PagePlus program. TypePlus is a font-effects package similar to Adobe TypeAlign and Power Up Software's TextAppeal. It lets you fit and type text on paths, such as curves, arcs, and circles, as well as accomplish several other special effects. ArtPack is a collection of over 500 full-color clip art images, and FontPack provides 120 TrueType fonts. You can also purchase each utility separately for about $20 each.

One of the weaknesses of the original PagePlus is its poorly written manual. The manual for version 2.0 has been completely revamped. The Getting Started tutorial is very well done. By the time I finished it, I had almost mastered the program. This is a night-and-day improvement over the documentation included with the previous version. The reference manual is also thorough and helpful. Not only does it cover PagePlus's powerful features, but it also offers many useful DTP and layout tips.

Serif's technical support team has always been great. The folks on the team are usually quick to answer the phone, knowledgeable about the program, and eager to please. The popularity of PagePlus 2.0 is so great, though, that the support lines now are sometimes clogged. However, a few times I've called about 8:00 or 9:00 in the evening, and my calls have almost always been answered quickly.

All this praise is not meant to imply that PagePlus 2.0 is the ultimate DTP solution. But then, no product (not even a $500+ package) is perfect. Where PagePlus falls short is in its long-document handling. It doesn't support automatic page numbering; you must manually number each page. You cannot combine several chapters to build a book, catalog, or directory. Nor can you generate tables of contents or indices automatically, as you can in several other programs, including economy packages such as Symantec's Easy Working Desktop Publisher. The program also lacks a spelling checker and a search-and-replace feature. Granted, you're supposed to take care of most editing before you import a file into your DTP package. However, it seldom works out that way—especially if more than one person works on or contributes to your documents. Not having a spelling checker and search-and-replace means that your text-intensive documents must be proofed thoroughly—which those of us spoiled by computers resist.



What PagePlus 2.0 does, it does extremely well, and to a greater degree of proficiency and with more ease than its competitors. It provides almost all the power of PageMaker at a fraction of the cost, and it's far easier to use and learn. With all its features and its low price, this package will be hard to beat. ❐

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Bradley M. Small

AN END USER'S LOOK AT OS/2 2.1

OS/2 has arrived as a full-fledged, widely supported operating system. But many people wonder whether they're safe giving up Windows and DOS in favor of this much-heralded entry from IBM.

Technically, there's a lot to talk about in OS/2 2.1. But if you're like most people, you probably don't care to hear about operating systems, device drivers, and other low-level techie esoterica. So I will do my best to avoid such discussion and cut to the chase. I'll begin by discussing how OS/2 can affect your productivity.

OS/2 can give your performance a boost, whether you're running DOS, Windows, or 32-bit OS/2 applications.

Can the right operating system increase productivity? It can—if it meets the following criteria. It must allow you to retain current systems that already work properly. It must be relatively simple to implement. And it must provide faster or more efficient ways to solve your current problems while allowing for growth.

OS/2 2.1 allows you to retain current systems. If you have it, you can run most of your existing MS-DOS, Windows, and OS/2 1.*x* applications. Under OS/2 you can run a specific DOS session (which is the equivalent of running a specific version of DOS). If all else fails, you can have DOS on your hard drive and boot from it using either Boot Manager or Dual Boot. So even in the worst-case scenario, you can still maintain your current systems until you've completely changed over to OS/2 and found more efficient ways to service those systems you intend to keep.

I found OS/2 2.1 relatively simple to implement. Installation was straightforward (by simply following the manual, I was able to install it without a hitch). It comes on either floppy disks or CD-ROM. Both versions install easily, but after going through the 20-odd disks in the set, I considered the CD-ROM version (which comes with a 2-disk boot set) to be a godsend!

The manual has an interesting feature: On the inside of the front cover in bold black print is the phone number for free technical support. I called it several times both during business hours and during the evening, and each time, after a cheerful greeting, my problem was solved—either immediately or in a callback within 24 hours. In these times when companies are either offering no technical support or charging exorbitant fees for it, free, high-quality technical support is much appreciated.

Once OS/2 is installed, you'll need about 15 minutes to an hour to get used to the Workplace Shell, depending on your experience with graphical user interfaces (GUIs). In my opinion, OS/2 is much easier to use than Windows, and it behaves more like a real-world desktop.

OS/2 2.1 provides faster and more efficient ways to solve your problems. Think how many times you've said, "I can't look up that phone number right now because I'm recalculating this spreadsheet" or "I'm formatting a disk; you'll have to wait." If you've ever had to wait while a program accessed information or while some DOS command was operating, then you've experienced a loss of productivity.

OS/2 is a 32-bit multitasking operating system. That means it can do more than one thing at a time. The fact that it's a 32-bit environment also means that it will use memory much more efficiently. You can format a floppy disk, download a file from your favorite BBS, and work in your word processor all at the same time (which is what I'm doing right now).

OS/2 has a text mode and a GUI mode; it will run DOS programs, Windows programs, and OS/2 1.*x* and 2.*x* programs. That should cover almost all of the software that you're running right now. I say "almost" because there are still some programs that won't run under OS/2 because they use low-level hardware or nonstandard memory access. However, OS/2 does provide methods for running some troublesome programs (as well as a listing of the programs that just won't run).

OS/2 claims to be a "better DOS than DOS." I thought that meant that it should run every DOS program ever written, but after I thought about it, I realized that was unrealistic. There are many DOS programs that I can't run from DOS without creating a special boot disk or different AUTOEXEC.BAT and CONFIG.SYS files.

What makes OS/2 a "better DOS than DOS" is that DOS programs run faster under OS/2 than they do under DOS. More than one program can be run at once, and each program can have its session adjusted to run as efficiently as possible.

OS/2 can rightly be called a better Windows than Windows also. The Windows applications that I ran were noticeably faster under OS/2, although they seemed to load more slowly. I found out that once you have a Windows session going, the loading time is reduced, so the advantage is still OS/2's.

Whole suites of applications are being ported to OS/2. In next month's "Personal Productivity" column, we'll take a look at the third-party support for OS/2 and the potential for growth of this ingenious operating system. ❐

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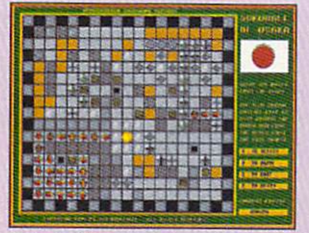
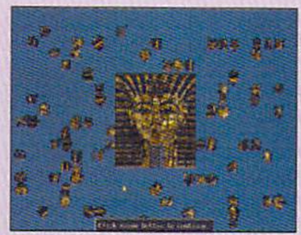


Sokoball requires careful planning for success.



Use Jigsaw and never lose the last piece again.

Sokoball

Sokoball is a version of the Sokoban puzzles that are becoming popular in this country. Sokoball adds ingenious hazards and obstacles like one-way streets, pop-up barriers, and changing floor plans; and it includes an editor for making your own puzzles.

Jigsaw 1.0

This is the best jigsaw puzzle program we've seen. The pieces are shaped like those in a real jigsaw puzzle (not blinking squares). You can save and load puzzles you're working on and sort pieces by shape or color. Jigsaw comes with three puzzles, and registered users can create their own puzzles.

Gobman 1.0

Gobman is a fantastic game similar to the arcade classic Pac-Man. Move around various mazes collecting power-ups, bombs, hourglasses, and special red pills to battle the pursuing ghosts.

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ART WORKS

Robert Bixby

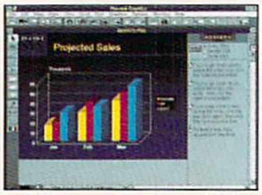
NEW ART

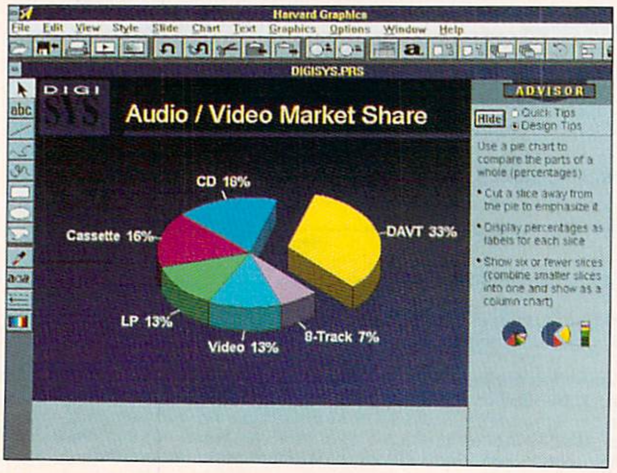
Two of the most useful products that have crossed my desk in the past couple of months are DynoPage and the new Harvard Graphics for Windows (in beta release). I've also had the chance to review the DigitArt woodcut collection (number 25 in the series) from Image Club.

To be fair, I have to admit that Harvard Graphics was never strictly a charting program. It was also one of the most full-featured vector drawing programs for DOS. When it made the big move to Windows about a year and a half ago, it stepped into the lion's den. There are more drawing programs for Windows than you can shake a T square at, and most of them are excellent, including one of the very first Windows applications—a drawing program from Micrografx.

You might recall that at approximately the same time Harvard Graphics for Windows appeared, a drawing program with a similar interface called Harvard Draw was released. Now much of Harvard Draw is a part of Harvard Graphics, with a lot of added effects, and it's known as Harvard FX. It's full of useful drawing tools like Extrude and Blend. Harvard Graphics with Harvard FX may have all the drawing tools most people need—particularly if those people create charts—because that's the main business of Harvard Graphics. The 2.0 version makes charting easier than ever with a friendly tutorial that helps you pick the right chart, enter the proper data in the right place, and come up with a professional-looking chart from the very first time out.

A new generation of Harvard Graphics for Windows





Use a pie chart to compare the parts of a whole (percentages)

- Cut a slice away from the pie to emphasize it
- Display percentages as labels for each slice
- Show six or fewer slices (combine smaller slices into one and show as a column chart)

DynoPage is a printing utility that you can use (under Windows) to get more control over your printer. Using it allows you to specially format printouts for your printer for booklets, note cards, and so forth. Once you have made the settings in the print setup utility, printing through DynoPage is just like using the Print Manager that comes with Windows, except that you have many more options for configuring the page.

Image Club has released a woodcut clip art collection. It's composed of vector (EPS-format) monochrome graphics that can be incorporated into most vector drawing programs. The graphics are specially created to look as if they were produced from woodcuts—products of that early printing technology which required an artist to gouge a block of wood to generate graphics for the printed page (most of this sort of art is now done with linoleum blocks). I found the collection to be utilitarian rather than imaginative, but perhaps I'm expecting too much from my clip art collections. It provides excellent graphics for many uses, and the roughly wrought look of the drawings makes them distinctive. This collection would make an excellent addition for anyone doing professional work that requires a homemade appearance.

I guess that means desktop publishing has come full circle—the standard output from a desktop looks so professional that now people are reacting against the perfection of line that's so easy to produce with a vector graphics program and a laser printer.

The graphics in this collection inspired me to create some woodcuts of my own using CorelDRAW!. The Powerlines and simple autotrace built into CorelDRAW! make creating woodcuts a snap.

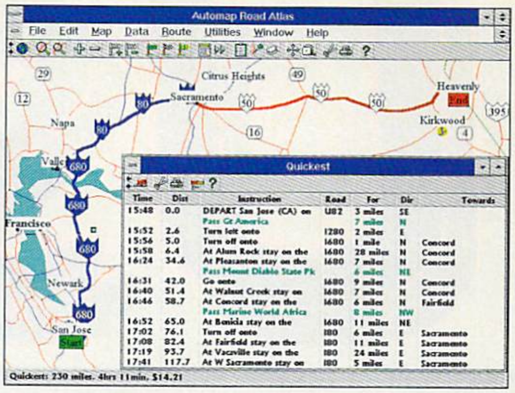
Gaea and James Merrick wrote recently to ask how a logo created in a paint program could be made to appear smoother on a page printed with a laser printer.

There are two basic solutions. You can trace the logo in a vector drawing program (1st Design and Graphics Tools have autotrace built in) and then use the traced image, which will be printed at the resolution of the printer rather than at the resolution of the paint program (around 72 dpi). If this isn't realistic, you can create the logo as large as possible and then reduce it for printout. By reducing a 72-dpi raster drawing to 25 percent of its original size, you have effectively turned it into a 300-dpi painting.

Thank you for writing, and thank you for the sample magazine you sent. It looks very thought-provoking. Good luck with your publishing venture.

Have a DTP tip you'd like to share? Let me know about it by calling (900) 884-8681, extension 7010203 (sponsored by Pure Entertainment, P.O. Box 186, Hollywood, California 90078). The call costs 95 cents per minute, you must be 18 or older, and you must use a touch-tone phone. Or write to "Art Works" in care of this magazine. And if you don't have a tip, call to let me know what you're up to, what software you're using, and how I can be of help. ❐

VS.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		Pass Gt America		7 miles	N	
15:52	2.6	Turn left onto	I280	2 miles	E	
15:56	5.0	Turn off onto	I680	1 mile	N	Concord
15:58	6.4	At Alum Rock stay on the	I680	28 miles	N	Concord
16:24	34.6	At Pleasanton stay on the	I680	7 miles	N	Concord
		Pass Mount Diablo State Pk		6 miles	NE	
16:31	42.0	Go onto	I680	9 miles	N	Concord
16:40	51.4	At Walnut Creek stay on	I680	7 miles	N	Concord
16:46	58.7	At Concord stay on the	I680	6 miles	N	Fairfield
		Pass Marine World Africa		8 miles	NW	
16:52	65.0	At Benicia stay on the	I680	11 miles	NE	
17:02	76.1	Turn off onto	I80	6 miles	E	Sacramento
17:08	82.4	At Fairfield stay on the	I80	11 miles	E	Sacramento
17:19	93.7	At Vacaville stay on the	I80	24 miles	E	Sacramento
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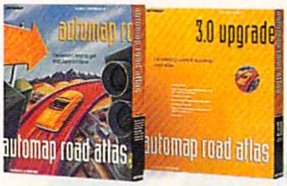
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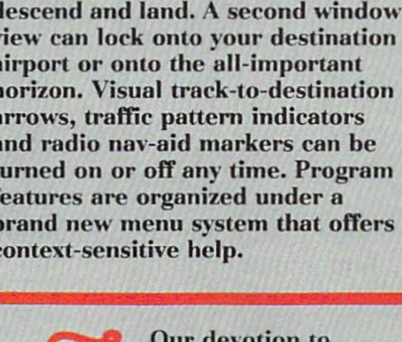

Midway Airport and Map View

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Children team up with a special pal as they learn about the world and develop their problem-solving skills in this cleverly designed mystery game.

Clayton Walnum

EAGLE EYE MYSTERIES

When it comes to sneaking education in with fun, Eagle Eye Mysteries is ingenious indeed. In this new educational game from Electronic Arts, children learn about everything from bats and caves to U.S. presidents while they solve a series of clever mysteries. The educational element is integrated so smoothly into gameplay that it's almost invisible. Add 256-color graphics and digitized sound, and you have an educational game that few children can resist.

The first thing Eagle Eye asks your child to do is to register his or her name with the program. This enables Eagle Eye to track the progress of many players, letting the entire family get in on the fun. After registering, your child chooses a partner (either Jake or Jennifer Eagle, the founders of the Eagle Eye Detective Agency), who will act as a town guide as well as a helper when it comes to discovering and recording clues.

Your child then sets to work solving the many cases available in the casebook. All told, there are almost 75 mysteries organized into three casebooks. Children may choose to solve any mystery in the current casebook, but they can't move on to the next book until they've solved all the mysteries in the current book. Although the mysteries in each book have the same names, they feature unique clues and different outcomes.

After having chosen a mystery, your child joins Jake and Jennifer Eagle in their tree house headquarters, where the three of them receive the background for the selected adventure. For example, in the Case of the Missing Skateboard, the Eagle Eye Detective Agency gets a phone call from Willy Barr, a local kid who says that his skateboard has been stolen from Shredd's Bike and Skate Shop.

Eagle Eye MYSTERIES USER'S MANUAL
Eagle Eye MYSTERIES
Ages 8 & Up

It's your child's task, along with help from Jennifer or Jake, to travel around the town, questioning people and gathering clues. To do this, your child simply clicks on a location on the town map, which brings the chosen location up on the screen. The logical first step in the skateboard mystery, for example, is to go to Shredd's Shop, where your child can question Steve Shredd and his customers, as well as examine the workroom from which the skateboard disappeared.

In each location, rectangles indicate areas that your child should examine or people that should be questioned. Clicking on a rectangle displays a portrait of the person or the object along with a text balloon containing dialogue for the scene. Often, Jennifer or Jake jumps in with a comment like "Look at that!" and points the child toward a particularly valuable clue.

Jennifer or Jake also helps by recording the clues on TRAVIS (Text Retrieval And Video Input System), a sort of combination video recorder and minicomputer that can be used to review and solve a case. After visiting all locations marked on the map, talking to all suspects, and examining all evidence, your child can click on TRAVIS and sort through the clues, choosing the ones that best solve the case.

It's the process of examining clues that really puts your child's mind to work. Over the course of a case, your child discovers many clues, but only the five that seem to best identify the culprit may be used to solve the case. Sorting through the clues is a challenging task, forcing your child to actually solve a case rather than just guess at the culprit. To add to the challenge, many mysteries have several suspects; only careful examination of the clues can reveal the guilty party.

Of course, while evaluating the clues, your child also reviews the educational facts gathered during the investigation. Because the facts are pertinent to the case at hand, they blend in nicely with the other clues. Again, the educational element is seamlessly integrated into the game.

If your child fails to choose the correct clues or cannot identify the guilty party, no penalty is given; instead, the program gently suggests that the clues need more careful consideration. Your child is allowed unlimited guesses, but the correct five clues must be chosen and the culprit identified before your child successfully solves the mystery and closes the case.

At the end of a mystery, your child's partner reviews the case, presenting all the clues and describing how they incriminate the culprit. Often, after a case has been solved, children will discover information during this review that they overlooked during the investigation. As a reward for solving the case, children receive a newspaper clipping about the case or a thank-you note from the victim. These rewards are added to the electronic scrapbook, which can be viewed at any time.

Another nice feature is that, whenever players view the map screen, the Eagle Eye control panel is accessible. This enables children to perform such tasks as switching partners, turning sound on or off, registering a new player, viewing a scrapbook, saving a case, starting a new case, or quitting the program.

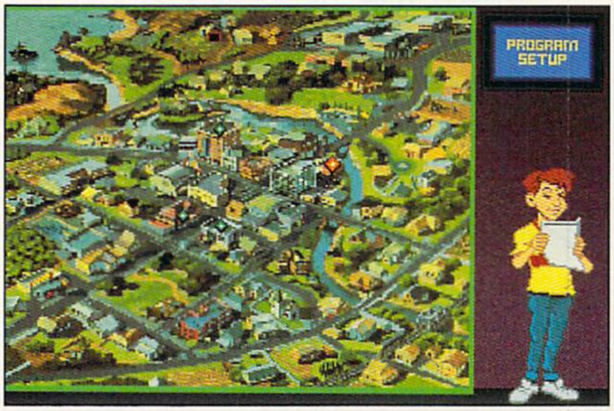
If all Eagle Eye had to offer were its clever melding of mystery and education, it would be a worthwhile investment. But the detailed 256-color graphics, original musical score, and digitized sounds and voices make this a guaranteed winner. Throughout each mystery, your child views various scenes about the town of Richview, with most scenes featuring simple animation effects. For example, after a fire in the Case of the Angry Arsonist, the interior of Grime's Novelty Shop drips water from the rafters; in Swank's Hotel, your child can watch a desk clerk fill out forms and the lobby elevators rise and fall. Digitized sound effects include ringing phones, a police-band radio, and various voices.

Although Eagle Eye targets the eight-and-older crowd, children under ten may have a difficult time following the logic of even the easiest cases. This is because children must select only the clues that best prove who the culprit is. Clues that don't directly point out the culprit, although they may play an important part in solving the mystery, cannot be selected when the player is about to accuse a suspect. In the tougher cases, sorting through the clues can be challenging even for an adult. Younger folks will require parental help in order to work through each mystery's logic.

Along with the software, Eagle Eye includes an activity book that contains dozens of puzzles. These puzzles, which feature cryptograms, word searches, rebuses, crossword puzzles, and others, all involve Jake and Jennifer in another mystery story. Moreover, the puzzles' solutions go together to complete a final puzzle that your child can submit as a contest entry. The contest winner will have his or her face featured in the next version of Eagle Eye.

Also included with the package is Electronic Arts' EA*Kids Theater, a graphical menu system. When installed, EA*Kids Theater enables children to start Eagle Eye, to view demonstrations of other games in the EA*Kids series, to get help, or to exit to DOS. If you purchase additional EA*Kids programs, you can add them to the EA*Kids Theater, giving your children access to all games from a single screen. The Theater also allows you to create a boot disk, select a Theater music score, delete previews or programs, and specify your hardware configuration.

IBM PC or compatible (16-MHz 80386 or faster), 640K RAM, 256-color VGA, hard drive with 9MB free, mouse; supports most sound cards—$49.95



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If Eagle Eye is any indication, Electronic Arts is on its way to putting together an impressive collection of educational software for children. Eagle Eye is as cleverly designed (albeit aimed at a younger age group) as Brøderbund's Carmen Sandiego series, and we can only hope that, like the Carmen series, Eagle Eye Mysteries will have a long run of sequels. ❐

Circle Reader Service Number 254

GAME INSIDER

Shay Addams

HOLIDAY GRAB BAG

A look at some holiday game releases that have high fun factors.

Tackled by a steroid-punchy linebacker, I teleported to safety in the mist-enshrouded land of Zona, only to be blasted out of the sky by a screaming F-16. Christmas approaches—the time of year when I rip through an onslaught of new games on my eternal quest for the best. Here are quick looks at the latest releases that have passed the Fun Test so far this season.

Adventures. Return to Zork brings Infocom's classic adventure up-to-date in a new story featuring digitized actors and an hour of spoken dialogue. SSI's Dungeon Hack is a 3-D role-playing quest with a random dungeon generator, extending replay value. Companions of Xanth takes place in the fantasy universe of Piers Anthony, whose books have sold over 7 million copies. The interface is easier to use than in previous Legend Entertainment games, even providing an undo button. Also look for Leisure Suit Larry VI from Sierra for the raciest adult entertainment (this may be a CD-ROM–only release) and The Legend of Kyrandia II, scheduled for CD-ROM and floppy.

Simulations. Accolade put a couple of titles into play in time for Christmas. Keep an eye out for Speed Racer. Based on a popular Japanese cartoon character, it's a fast-paced motorcycle simulation with an emphasis on arcade action. But don't look for the previously announced Mike Ditka Football II. Ditka was apparently ditched, and Accolade's latest football simulation, with a fresh string of gridiron features and effects, is called Savage Sunday.

Dynamix brings Sid and Al's Incredible Toons, an animated cartoon-style game based on the same concept as The Incredible Machine. If you've ever watched Wile E. Coyote build one of those complicated traps for the Roadrunner, you'll get the idea behind Toons. Graue Wölfe, the Dynamix sub simulation, has been renamed Aces of the Deep (turns out the original name is also used by a terrorist group!) and rescheduled for early 1994. EA's SSM/21 Seawolf, the sequel to 688 Attack Sub, should hit around Thanksgiving, featuring full support for 16-bit General MIDI sound. The more than 100 digitized sounds are often used strategically; you must learn to distinguish sonar signatures of whales and different types of submarines, for instance.

Star Wars fans can find excitement in two LucasArts titles. TIE Fighter is the Empire's answer to X-Wing. It's a standalone space combat simulation in which you fight for the Empire instead of the Rebel Alliance. LucasArts also has a CD-ROM–only action game, Rebel Assault, based on the Star Wars story. (Besides IBM CD-ROM, it's also available for Sega CD and CD-I.) SimCity 2000, available for IBM and Macintosh, is an entirely new program, not just an upgrade. Maxis delivers 3-D graphics, a map you can rotate and zoom in on, and countless new elements suggested by SimCity enthusiasts, including subways, hospitals, and even a functioning water system. SimFarm is another hot simulation from Maxis.

Edutainment. Best known for gambling simulations, Villa Crespo may soon be famous for The Cookie Break Series, high-quality software at budget prices ($12.95). The first titles are Adventure Math and Flags of Every Nation. Adventure Math uses a very graphic design to teach subtraction, division, multiplication, and addition. Flags of Every Nation is a one-of-a-kind program with illustrations of over 600 flags; when one is displayed, you can click on it to get details about the flag's nation or its historical significance. The program includes a trivia game that incorporates these facts.

Money savers. Besides new games, look for great deals on collections such as Legend Entertainment's Spellcasting Party Pak, with all three of Steve Meretzky's wacko adventures (a CD-ROM version may follow the floppy). Villa Crespo has a bundle with some of its best gambling games, including Jack's Plus Video Poker, Mini-Blackjack, and three more.

CD-ROMs. Sir-Tech has two new CD-ROM collections for the PC: The Wizardry Trilogy, Part II contains Heart of the Maelstrom, Bane of the Cosmic Forge, and Crusaders of the Dark Savant. Another collection offers these three, the first four Wizardrys, and a history of Sir-Tech and the Wizardry series. Adventurous gamers should also check out Origin's Ultima Underworld 1 & 2 CD-ROM collection. The Coffee Break Series CD-ROM Collection puts 21 of Villa Crespo's games on one CD-ROM for only $79. Villa Crespo also has one of the most intriguing new CD-ROM titles in Rosemary West's House of Fortunes, which uses tarot cards, astrology, and three other methods to tell your fortune.

Video games. Need something to keep the kids off your computer so you can play a *real* game? If you've got a Genesis, try Mutant League Hockey, EA's comic-style interpretation of hockey that stars cartoon characters in a hockey game with no rules. Inspired by the "Young Indiana Jones" TV series, Westwood's Young Merlin is a SNES quest aimed at young adventurers. ❐

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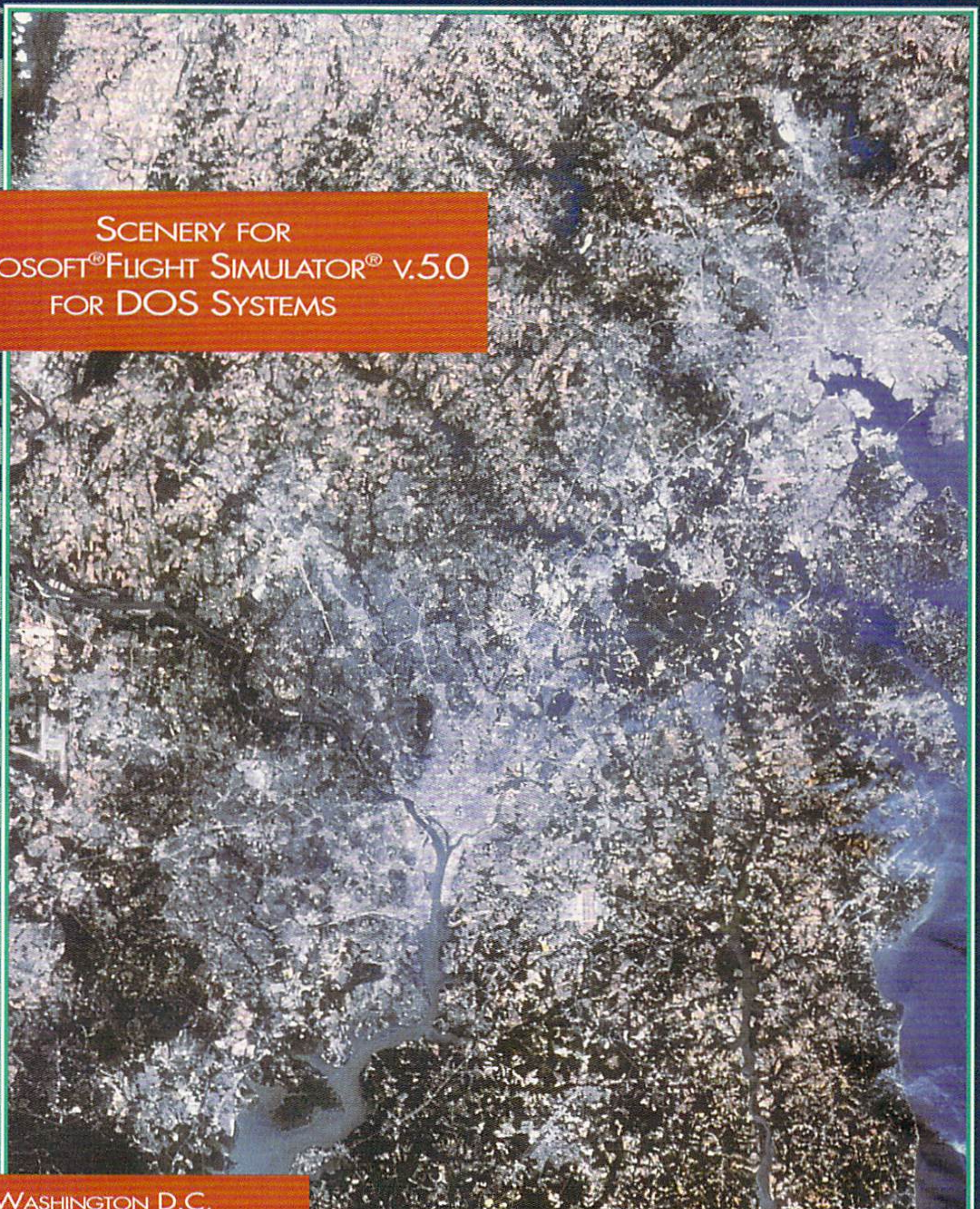

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ENTERTAINMENT CHOICE

Enjoy new levels of realism when you explore this nonlinear fantasy world full of rich characters who learn and change as you play.

Scott A. May

BETRAYAL AT KRONDOR

One of the dangers in embracing new technology lies not in blindly forging ahead, but in losing sight of what's being left behind. In the booming business of entertainment software, where flash often rates higher than substance, it's easy to put presentation before gameplay—it's like building the perfect beast, yet neglecting to give it a heart and soul. That's why Betrayal at Krondor is such an exciting arrival: Its captivating story line provides the game's heart; the fantastic graphics and special effects are extras. It's amazing that this game, Dynamix's first attempt at fantasy role-playing, towers above the genre.

Betrayal's quality won't surprise fans of veteran designer John Cutter, best known for his mid-1980s sports titles at Gamestar and Cinemaware. Cutter based Betrayal on the popular Riftwar fantasy series created by Raymond E. Feist. The story picks up where Feist's latest book, *Darkness at Sethanon,* ends. It uses many recurring characters and locations from the series, so those familiar with the series will immediately and comfortably fall into the action. Newcomers can get into the game by reading the brief synopsis of this saga, although the synopsis may not provide all the information they need to succeed in the game.

The setting for Betrayal is the Kingdom of the Isles, a vast fantasy world that's divided into several geographical and political realms and is populated not only by humans but also by elves, dwarves, trolls, and many other strange creatures. Just below a large, jagged mountain range, Seigneur Locklear and his young magician companion are escorting an elf prisoner named Gorath to the southern city of Krondor. Gorath, a halfbreed traitor to the Moredhel tribe, bears an urgent message for the prince, one warning him of an assassination plot. As the three tread quietly through dangerous territory a long way from home, Locklear unshackles Gorath, realizing that in the event of an attack, the elf's fierce fighting ability far outweighs any need for security. Thus begins the story of this unlikely trio of adventurers.

Betrayal at Krondor
VGA
Dynamix
Fairy Chests

This complex, character-rich story unfolds as a series of nine individual chapters, the plot advancing only upon completion of specific goals in each one. These miniquests vary in size, difficulty, and clarity of mission. Segmenting the story this way gives great range to the gameplay—it's as if you're getting nine adventures in one.

This game differs from traditional role-playing games in that there's no creation of instant characters or an omnicsent power rolling dice to determine a character's attributes. Instead, you inherit full-bodied characters with unique personalities, rich pasts, and hopefully, prosperous futures. Rather than control every fiber of their beings, you merely make decisions—their overall strength of character determines the results of their actions. Likewise, the outcome of your decisions helps mold each character. There's a subtle distinction between this and traditional character determination, but it's important enough to place Betrayal far beyond the average hack-and-slash fantasy.

There's also an important distinction between this game and run-of-the-mill graphic adventures, in which you merely turn the page on a set story board. Playing Betrayal is like participating in the creation of a novel. Totally nonlinear in design and unconfined by time limits or spatial boundaries, it can be enjoyed in various ways: straight through, for the less adventuresome; or in a meandering fashion, for dedicated explorers who are compelled to examine every nook and cranny. No two games are exactly alike, as each is influenced by random events and learned behavior.

There are plenty of other unusual aspects to Betrayal, including an uncommon blend of graphic modes. Wilderness areas are rendered in textured 3-D polygons, the same 3Space technology Dynamix employs in such flight simulations as Red Baron and Aces over Europe. Players are free to roam this virtual fantasy world—224 million square feet of trails, rivers, mountains, lakes, islands, and towns, not to mention convoluted sewers and abandoned mines. The three-dimensional terrain rises and falls as you move, with multiplane background scrolling and ambient sound effects providing a remarkable illusion of real time and space.

You can view wilderness and underground travel from an adjustable top-down perspective, helpful for both quick passage through familiar territory and a bird's-eye scan of surrounding lands. In tunnels, this option doubles as an automapping device.

When speed is an important consideration, you can lock your party onto the path. Of course, by sticking strictly to the path or navigating from a high angle, you can easily miss some interesting or potentially helpful objects because they are outside your field of vision. Likewise, locking onto a path is an easy way to stumble right into a trap.

Combat transpires with yet another unusual strategic point of view. Opposing characters square off on a makeshift battle grid; each is allowed a preset number of squares to move and strike. You can fight this turn-based battle by controlling individual actions (advisable when you're using magic, using special weapons, or facing especially challenging opponents) or by letting the computer play it automatically (when the outcome will clearly be in your favor).

Combat features fully developed, digitized characters, with more than 2500 frames of rotoscoped animation and crisp sampled sound effects. Using magic or modified weaponry also triggers special visual effects.

Static artwork (transitional scenes of castles, for example) features beautifully scanned 256-color paintings. The lush character interface is also thoughtfully styled, with well-designed treatment of standard role-playing mechanics such as a drag-and-drop inventory system. Four levels of graphic detail help keep wilderness movement fluid and realistic (although by their nature, polygon-based graphics animate well at even minimum system requirements). Other graphic highlights include the texture-mapped tunnels and magic temple portals, which you can use to zap your party over great distances.

Weaknesses include an overreliance on digitized, color-enhanced photos to represent every character in the game. It's unclear whether these are pictures of hired actors or merely snapshots from a Dynamix office party. It's an attempt to create atmosphere, but the glued-on beards and plastic elf ears only threaten the game's overall impression of grandeur. Also, the game suffers in some areas from the blockiness associated with 320 × 200 low-resolution VGA.

One final, minor complaint: Those who are unacquainted with Feist's complex fantasy world—face it; this is strictly a niche market—will have some trouble following the flood of characters, race names, and locations. The story's political and social history alone weaves a tapestry so rich that many will find it difficult to understand. References to obscure names and events, obviously important to the story's development, will often pass by unrecognized. The otherwise excellent manual helps, but Feist's prose is so thick with atmosphere and imagination that jumping headfirst into the fray can be quite overwhelming.

But after you understand the background, you can really appreciate this game. Fired by literary passion and uncommon intelligence, Betrayal at Krondor approaches a new level of realism and enjoyment for computer fantasy role-playing games. ❒

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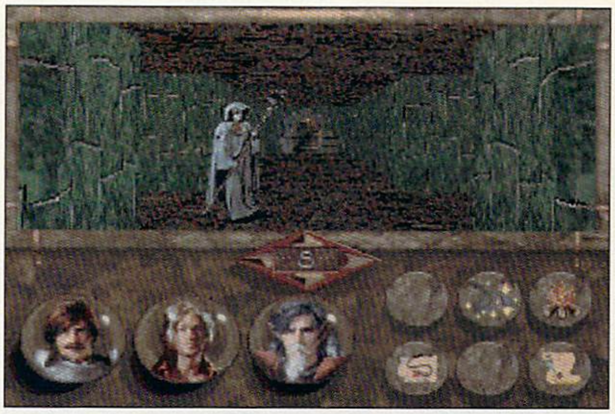

IBM PC or compatible (80386SX compatible); 2MB RAM, 1MB EMS; DOS 5.0 or later; 256-color VGA; hard drive with 15MB free; mouse recommended; supports Sound Blaster, Ad Lib, Roland MT-32, and general MIDI sound cards—$69.95

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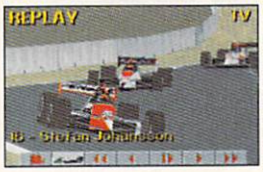
GAMEPLAY

Denny Atkin

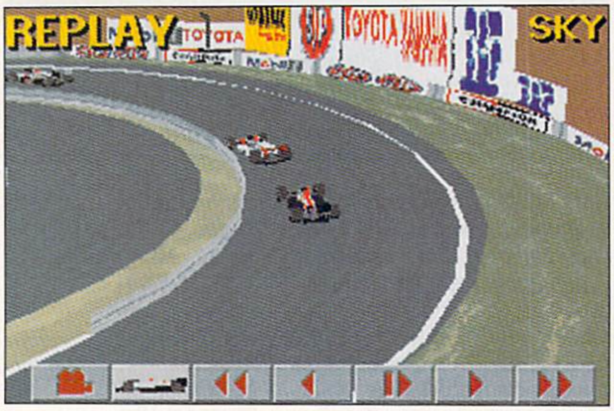
BETA GAMES

This is not your father's "GamePlay" column. Starting with this issue, "GamePlay" will be the spot where you can find hands-on looks at the newest games for your PC.

Until recently I was editor of COMPUTE's special Amiga section. When the Amiga edition shut down, my bosses noticed that I played games on nearly every electronic platform out there (I'd be a gourmet chef if they'd invent a flight simulator I could play on my microwave oven) and decided to make me entertainment editor. My mission with this column is to snoop out prerelease copies (called betas in the industry) of new games so that you can find out what's new and hot at your local software emporium. The games I'm seeing a couple of months before they're released will often have just reached the shelves of your dealer by the time you see this column.



IndyCar Racing uses 3-D Super Texture technology for ultrarealistic graphic effects.



Waving the checkered flag. One of the hottest games for the holidays is sure to be IndyCar Racing, designed by Papyrus and distributed by Virgin Games. Papyrus designed the 1989 Electronic Arts hit Indianapolis 500: The Simulation, and if you liked that game, you'll *love* this one. You'll drive 800-horsepower IndyCars around tracks ranging from the oval at Michigan International Speedway to the corkscrew curves at Laguna Seca.

You can just hop in the car and start driving, or you can stop by the garage first and adjust your car's handling characteristics by changing the suspension stiffness, wing angles, gearing, tire hardness and pressure, camber, and more. There's even a dyno room where you can custom-tune your car's engine.

From there it's off to 1 of 12 tracks to qualify and race. When you first hop in the cockpit, you'll likely get run over by the other drivers because you'll be sitting there gawking at the amazing scenery. Although IndyCar Racing uses flight simulator–style polygon graphics, Papyrus texture-maps the objects with realistic bitmaps. The track is replete with skid marks and grooves, and the cars are covered with authentic sponsor stickers. You'll find yourself slowing down on the curves just to read the advertising billboards! When you scrape the walls or wreck, realistic smoke whiffs from your car. I recognized buildings that I'd driven past in real life when I was driving the Long Beach Grand Prix course—IndyCar Racing has some of the best-looking, most realistic graphics in PC-game history. When watching replays of your race, complete with camera cuts, you'll feel like you're watching the race live on TV.

Driving is a blast with a joystick, but it's especially fun with CH Products' yoke controller. There are varying realism levels: On the easy levels you can pretty much just worry about steering and braking, but with realism active, you'll find that rain, wind, and temperatures all affect car handling. There's more here than I have room to talk about, but suffice it to say that this is *the* game to come home and play after a frustrating afternoon in stop-and-go traffic.

Golden oldie. If you were around for the birth of the personal computer industry, you may remember the incredible batch of games that Electronic Arts entered the market with. These classics, such as M.U.L.E., Pinball Construction Set, Archon, and Seven Cities of Gold, may not have been as sophisticated as today's PC games, but they were eminently playable and good for months of fun.

Now two of those classics have been updated for today's PCs. Archon is coming soon from SSI, promising SVGA graphics and new play options. EA has taken a more preservationist approach with its Seven Cities of Gold Commerative Edition for the PC. The game now brandishes enhanced sepia-toned VGA graphics and smoother gameplay (you no longer kill natives just by bumping into them), but otherwise, it remains faithful to Dani Bunten's Commodore 64/Atari 800 classic.

You're a fifteenth-century Spanish explorer out to conquer the New World. You explore territory in search of gold and New World goods, which you can take back to Europe and use to bring back an even larger and more powerful expedition. You can trade with the natives or conquer them—it's up to you. But if you take the violent approach, word will spread, and your explorations may become increasingly bloody. Once you've conquered the Americas, Seven Cities can generate new, random worlds for you to explore. The game is simple to learn and play, and it's great fun. Kudos to EA for bringing back a classic. ❐

64/128 VIEW

Look for major changes in Gazette, starting with the next issue.

Tom Netsel

This issue marks a turning point in the history of Gazette. This is the last issue that will be printed on paper. Next month, Gazette moves entirely to disk.

While the shift from ink to pixels means a new format for Gazette, its content will reflect little change. The columns and features that you've come to expect in the magazine will now be on disk. Jim Butterfield, Fred D'Ignazio, Larry Cotton, and Steve Vander Ark will continue to share their ideas, comments, and expertise in their usual columns.

Look for feature articles, reviews of software and hardware, and "Feedback," too. All the text that was in the magazine will be on the new double-sided Gazette Disk. You'll be able to read these articles onscreen or send them to your printer.

Those of you already familiar with Gazette Disk know how convenient it is to have all the monthly programs ready to load and run. There's nothing to type in. Until now, there was no documentation on disk; you needed the magazine to make full use of the programs. Now, each disk will include full documentation. As with the articles and columns, you'll have the option either to read the instructions onscreen or to print out a hard copy.

For some time now, we've added bonus programs on disk that were not listed in the magazine. These programs were often too large to offer as type-ins. In our new format, we can now provide you with more programs and larger ones. With no more tedious type-ins, we don't have to worry about the size of the program listings.

Our programs may be larger, but don't expect quality to suffer. We'll keep our high software standards. We have some exciting programs coming up. On the disk next month, look for a SpeedScript patch from Frank Gordon that combines a RAM disk/dual drive option with a word-count feature. Frank's original program let SpeedScript users access two drives, but it wasn't compatible with an earlier word-count program. Now you can have both great features in one.

I want to encourage programmers to keep submitting games, utilities, and productivity and educational programs. Gazette is still in the market to purchase outstanding software.

The price of the new double-sided Gazette Disk will be $49.95 for 12 monthly issues. Those of you who already subscribe to the disk will receive the new Gazette, commencing with the January disk. We think you'll be pleased with the extra value that you'll be getting.

If you subscribe to the Gazette edition of COMPUTE, you'll have this one-time opportunity to convert your subscription for only $29.95. Look for a pull-out card in this section for full details. If you decide not to convert, then you'll continue to receive COMPUTE for the balance of your subscription.

I know this is a major change for Gazette, but I hope you'll take advantage of the upgraded Gazette Disk with its new look, fresh format, and added features. ❐

GAZETTE

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Major changes on tap for Gazette.
By Tom Netsel.

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Volumn 1, Issue 1

The 64 Go

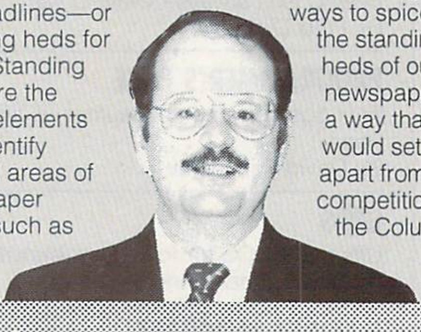
WRITTEN BY HAROLD STEVENS JR.

People are always amazed when I tell them about the things that my Commodore 64 can do. They are usually blown away when I tell them how I use the 8-bit computer in a professional environment as part of my job as a journalist.

I edit a suburban weekly newspaper in Columbus, Ohio. My 64 played a major role in helping me redesign and create a whole new set of graphic devices that we in the newspaper industry call standing headlines—or standing heds for short. Standing heds are the visual elements that identify special areas of newspaper copy, such as personal opinion columns, letters to the editor, community news and events, obituaries, weddings and engagements notices, and business news.

My 64 was the answer to a problem we had a few years ago when we decided to streamline our standing heds. Our mainframe typesetting computer, a Compugraphic MCS-100, was unable to do so without our having to shell out hundreds of dollars for software to help us get what we wanted.

We were looking for ways to spice up the standing heds of our newspapers in a way that would set us apart from our competition in the Columbus area. We wanted something to indicate that the five editions of the Columbus Messenger Newspapers were on the move and were progressive enough to take advantage of contemporary newspaper design, while being cost effective at the same time. Like many small businesses, we don't have a whole lot of money to spend in our pursuit of innovation unless it returns a profit.



It's my turn...

by Harold Stevens, Jr.

business briefs

A New Look

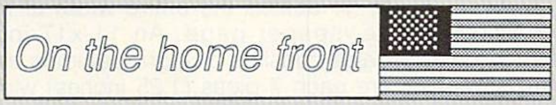
We wanted to create new and radically designed standing heds that would be streamlined and would utilize a dot-screen background with white, or reverse, lettering. Since we were unable to do this with the Compugraphic MCS-100 without the expensive special software, we thought we would try to create these headlines with the equipment we already had. We tried printing them in black with white, or reverse, type facings and then shooting them with a gray screen on the PMT camera in our production department. This didn't work. The results were muddy, and we didn't get the nice clean copy that we wanted.

My publisher was toying with the idea of buying the software for the Compugraphic when I hit upon the idea of using my 64 to do the task. If it worked, it would cost us nothing. About that time, our company bought an Apple LaserWriter II-NTX laser printer for use by our classified advertising department to go with its new IBM clone. That computer was purchased to print our classified ads and to keep accounting records for that department.

Since the PC didn't have any desktop publishing software with it and the LaserWriter was a PostScript-driven printer, I was sure I could publish what we

es to Press

needed on the printer with the 64 and PostScript-compatible geoPublish. I volunteered to do a couple of samples to see how they would fly.



GEOS to the Rescue

The first thing I did was to go home to boot up GEOS. I created samples of the standing heds with geoPublish and printed out a rough draft of what these special graphics would look like on my Star NX-1000C dot-matrix printer. This was enough proof to management that my 64 could do the work. I was asked to start working on the standing heds as soon as possible. All that I required now was an RS-232 interface to connect to the printer.

Finding such an interface in the Columbus area was almost impossible, and the ones I located were expensive. I was told by a couple of computer stores that I could purchase an interface to hook up the laser printer to my modem port for about $100. "No thanks," I said. That's when I turned to the Tenex catalog for help.

What I did find was an Aprotek Universal RS-232 Expansion Interface for about $40. Immediately I ordered the interface and received it a couple of weeks later. The Aprotek interface was exactly what I was looking for. It's designed so I can connect between a printer with an RS-232 port and a Commodore-style modem.

The second thing I bought was a six-foot RS-232 extension cord from Radio Shack. This let me set up my computer near the newspaper's laser printer.

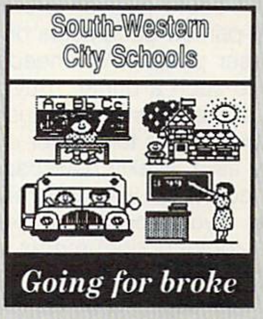
Trial Run

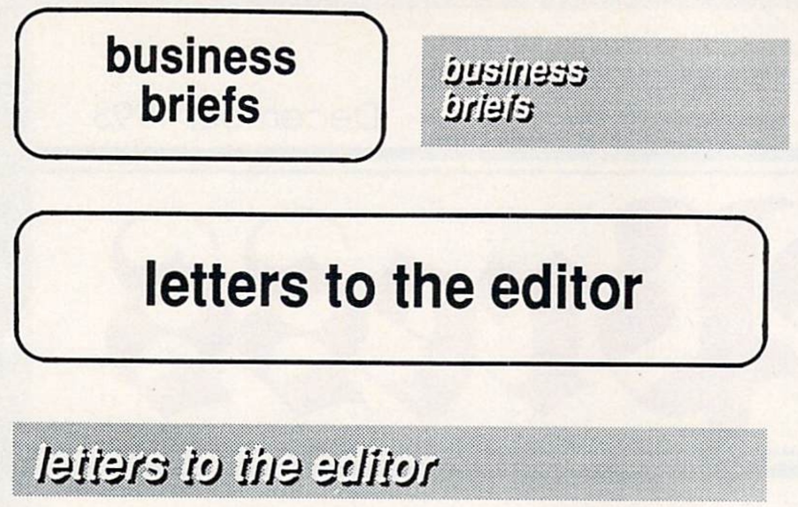
On the following day, I hauled my computer and peripherals to work and set up shop not too far from the laser printer. When I hooked up my spare amber monitor, geoRAM expansion unit, and 1541 and 1581 disk drives to the computer, I was ready to go. All I had to do now was plug in the interface to the 64's user port and run the RS-232 cable between it and the laser printer. I then booted GEOS to print the samples that I had created earlier and printed on my 9-pin dot-matrix printer.

Once in GEOS, I moved the cursor to the geoPublaser icon and double-clicked it. The screen went blank, and a menu then dropped down on the screen asking me to choose the RS-232 serial transfer rate of either 9600 bps or 1200 bps to print the geoPublish files. Since I knew 9600 was eight times faster than 1200, I naturally clicked on it. Now I was becoming excited. I was taking the first steps toward using my Commodore for what I really wanted it to do—desktop publishing.

After setting the bps rate, the file dialog menu dropped down for me to select the file that I wanted to print. I moved the pointer to the name of the standing heds sample that I had previously created and clicked it to open the file. Next came the print option menu asking me the number of pages and copies that I wanted to print and which smoothing setting to use for the graphics. Since nothing needed to be changed, I clicked and sent the file to the printer.

I held my breath as the monitor went blank and the print indicator light on the LaserWriter started blinking. A few minutes later the file dialog menu reap-





These are the before and after illustrations of what the standing headlines looked like then and now. Before we changed the standing headlines using the Commodore 64C and geoPublish, they were just boxes with rounded corners with the type centered inside the boxes. The top left standing hed was how our boxes were before we changed to the current appearance of the one on the top right . As you can see the newer headlines created on the Commodore look more streamlined in the new format when we changed from the round boxes to the screened bars.

peared, and the laser printer started whirring. Out came a printed page. I was excited as I picked up the first print-quality document created by my very own 64. At last, my dream of being able to print professional-quality documents on it had come true.

When my wife gave me the 64 for Christmas in 1987, never did I think that I would be able to do professional-quality desktop publishing on it. She had purchased the computer for me to use as a word processor. I would write stories on it and then store them to floppy disks to eliminate the piles of paper that accumulated around my old electric typewriter.

Dreams to Reality

When I discovered geoPublish, I learned that I could publish professional-quality printed documents on a PostScript laser printer. All I needed was access to such a printer. Buying one was out of the question because I didn't have the money to pay for one on my salary as a weekly newspaper editor. All I could do was to dream that someday I would be able to print professional-looking documents on my 8-bit Commodore. Once the laser samples were printed, the dream had become a reality.

Once we saw the samples, we started refining the standing heds. We had a few technical problems to work out. First, we had to decide the best percentage that the dot screen for the bars and boxes should be. Since 50 percent and above printed too dark, we settled on a 25-percent screen. We had to make the dot screen as light as possible to keep the printing process from blotting out the white type facing and muddling the dot screen. Ink has a tendency to bleed into the fibers of newsprint paper.

I began to play around with the design of the type facing so that we could produce white lettering with black shadows behind it. We felt that the shadow effect would allow the white type to stand out more clearly against the 25-percent dot screen background. Then I put the type in italic style to give it the feeling of being in a forward motion. Once this was done, I printed new samples and showed them to the publisher and managing editor. We all agreed that this was how it was to be done.

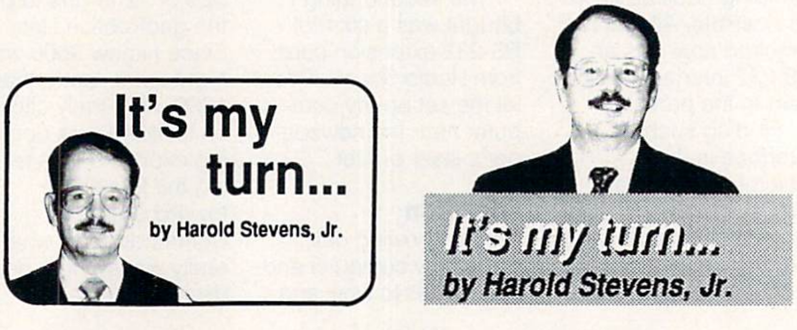
I then sent out a memo to the other editors on the staff asking them to list the names of all the columns and features that appeared in their respective newspapers. Since all five of us share common standing heds for local events, military news, school news, and so on, we created these first.

Next came the standing heds that were customized for each individually zoned paper. For example, I run columns submitted by the high schools in my area while another editor runs a feature on saving money with coupons, and a third editor has a poetry column.

Days at the Keyboard

For the next few days, including the weekend, most of my spare time was spent creating headlines in various sizes to fit in the editorial copy section of the paper. First, I set the headlines to go across the entire width of the newspaper page. An 11-x17-inch page consists of eight columns that are each 7 picas (1.25 inches) wide. This meant that the heds had to be 63 picas or about 10.5 inches long, which is the length of a geoPublish page.

The headline bars had to be one-half inch tall with the type set in 24-point GEOS font LW Cal. This type style is also known as Helvetica to the rest of the printing industry. The text was also set up at one-eighth inch from the left edge of the screen bars. Previously, the standing hed bars were one-inch boxes with rounded corners and type set in upright Helvetica of 30 points.


It's my turn...
by Harold Stevens, Jr.
It's my turn...
by Harold Stevens, Jr.

Using my personal opinion column as an example, you can see how we improved the looks of our editorial page by going from a rounded corner box to a screened one. Also, changing the type style to italics with white lettering and "shadows" makes the standing hed appear more exciting than before.

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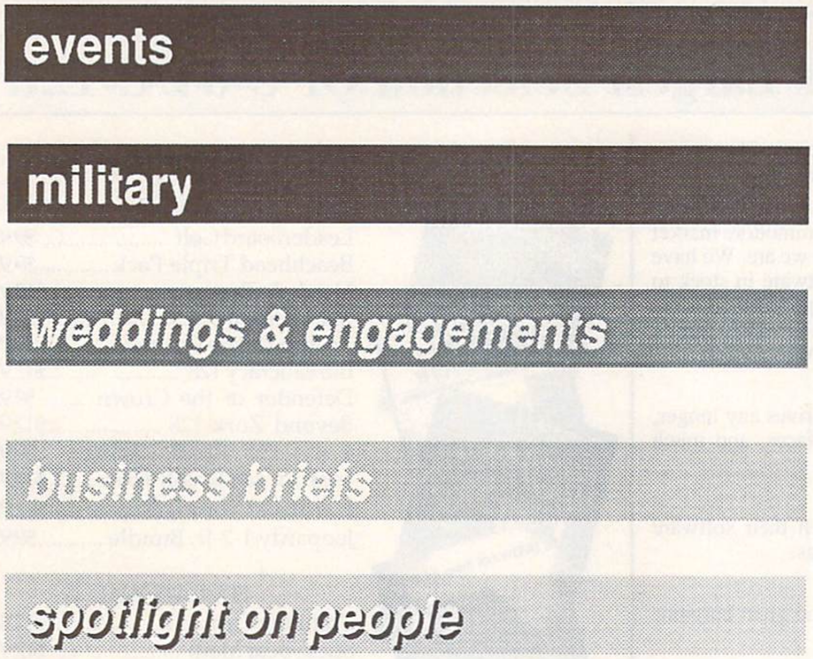


To determine what kind of screened background we wanted for the standing headlines, I tried white type against different percentages of the screen. On top is 90 percent screen, followed by 85 percent, then 75 percent, 50 percent and finally 25 percent, which was what we settled on. We decided to add the "shadows" to highlight the white type facing to give it a more fuller look.

I created these standing heds so that they could be trimmed down to six, five, four, three, and two columns in width. For the personal opinion columns, such as those written by the editors to appear on the opinion-editorial page, I created screened boxes that were three quarters of an inch tall and two columns wide with the name of the column in 18- or 24-point size and the author's name in 15 points. The only difference between these standing heds and the others was that the author's name was set in black type.

The personal opinion columns weren't the only items set in the two-column screened boxes. There were some standing heds whose words were too long to fit into the half-inch by two-column format. For these headlines I had to create a two-column by three-quarter-inch screened box and place the names of the feature in two lines of type, with the words printed in 18-point type. Creating these thicker two-column headlines also gave us a variety of designs to choose from when we laid out the pages.

After creating the screen bars, I placed the black type, which was to become the shadow of the words, about one-eighth of an inch from the top and left edge. Setting the white type over the black one-eighth of an inch from the top and left edge of the half-inch screened bars in opaque mode produced the shadow effect that I wanted. In the two-column boxes, I placed the shadows and white type the same distance from the top and left edge. Both the shadows and overlaying white type were set in italics.

After I corrected small placement errors and ran out the headlines on the laser printer, we had them shot on the PMT camera. This converted them to photographic paper and made them more durable so that they could be reused every week. Shooting the headlines on photo paper also sharpened the resolution of the dot screen, the white letters, and the black shadows. The final results looked as though we had used the Compugraphic typesetter to create them. This process took the 300-dots-per-inch resolution of the laser printer and enhanced it to make the heds appear as if they were 600 dpi or greater.

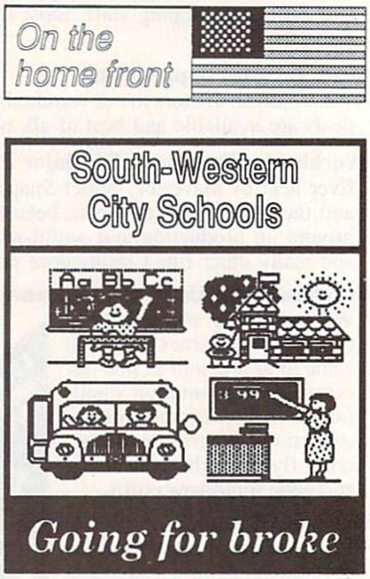
Start the Presses

Production day rolled around. The standing heds were shot on paper and waxed to be pasted onto the page with the stories, photographs, and other copy. The pasted-up pages were then shipped to the printer. Two days later, our sample copies of the papers came back. We turned to the pages that had the standing heds, and they looked great. To tell you the truth, looking at the resolution on the newsprint page, we couldn't tell the difference between them and anything printed by the typesetting machine.

Later, I purchased a second computer and a 1581 drive to keep at work so that I wouldn't have to lug my 64 back and forth when it was needed. I also added an amber monitor for better onscreen resolution.

The 64 with a 1764 RAM Expansion Unit and a second 1581 sits on a desk of its own in the office. Since I installed the computer and created the standing heds, I have used this system to create other graphics to be used with stories in our newspaper. I am most proud of the one created during the Persian Gulf War that signified stories about local people who supported the troops overseas.

As an added bonus, I was able to use the system at work to publish an eight-page newsletter for my user group, the Central Ohio Commodore Users Group. For three years now I've been able to use my 64 in a professional manner. The icing on the cake came the following year when the company gave me a nice pay raise for doing the impossible on the 64. ❑



Above are samples of other graphics and art work that was produced on the Commodore 64C using geoPublish. The bottom graphic was used as line art to draw peoples's attention to a story on a school district"s financial woes, while the one on the top was used to signify stories about local people involved in the Pursian Gulf War in 1991-1992. The stars in the flag are the letter "H" in LW_Shattuck font.

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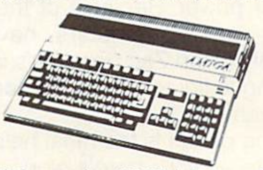

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WRATH OF THE DEMON

Are you bored with the games that are available for the Commodore? Do you get discouraged by programs that promise a lot but deliver little? Do you think you'll have to upgrade to a PC in order to get full screen graphics and true multilevel action? Then Wrath of the Demon by ReadySoft has some delightful surprises in store for you.

The creative wizards of the Abstrax research team have come up with a phenomenal program in Wrath of the Demon. This game offers the scope, graphics, multilevel scrolling, and sound track that previously had been available only to PC owners.

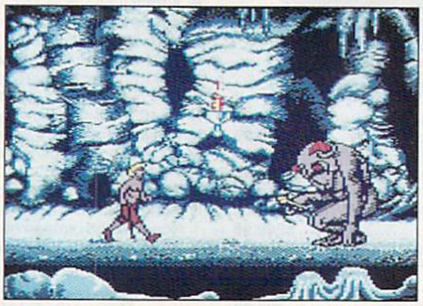
The game itself is a challenging quest that pits a demon and his host of minions against our hero, an unassuming stranger who happens to be in the wrong place at the right time. The hero (you) is entrusted with the mission of finding and saving the princess and ridding the kingdom of the evil demon. If he succeeds, the king has promised the hand of the princess. If he fails; all is lost.

The game opens with an impressive musical score. It's just one of nine musical selections you'll hear throughout the game. The title graphic tells the story. It shows a bullish demon holding a sphere with the lovely princess imprisoned inside. Off to one side, our handsome Conan-like hero rushes to the rescue, brandishing his sword.

Sure, a lot of games have impressive title graphics, but then the games don't live up to the promise. The graphics in those games end up being either too small or uninspiring. You know the kind I mean—the ones where a character who looks like a minuscule stick man moves along the bottom inch of the screen and the rest of the screen is a solid blue that I can only assume is supposed to represent the sky. If that's what you've been seeing, you aren't going to believe your eyes when you load Wrath of the Demon!

The Abstrax team originally designed Wrath of the Demon to take advantage of the sophisticated hardware in the Amiga computer system. When they converted the program for the Commodore, they were determined to push that hardware to its limits. They succeeded admirably. The game has over 600 screens of action; smooth, high-tech parallax scrolling; and richly detailed graphics that utilize more than 100 colors.

The animation is superb. There are over 1400 frames in the game. The frames scroll smoothly across the screen without jumpiness or distortion. For example, the opening level features our hero riding a galloping white charger. The mountains, shrubs, and clouds scroll by flawlessly. In addition, there are rocks to be hurdled, skeletons to be avoided, and small bottles (potions) to be collected for later use.


The animation in Wrath of the Demon is superb, with more than 1400 frames.

The characters have a wide range of movement. They jump, walk, roll, duck, and fight. In the opening scene, the hero must lean down from his saddle and scoop up items while his steed thunders forward at full speed. He must also hurdle rocks and other obstacles that get in his way. In fact, the horse will balk rather comically and refuse to go further if the hero doesn't guide him over an obstacle.

Meanwhile, the hero also has to watch what he is scooping up. Small bottles represent potions, but skulls, rocks, and other items will drain the hero's energy if he touches them. Don't be fooled into thinking it would be easier to just gallop forward without attempting to gather objects. He'll need the potions later if he hopes to have success against the various monsters he'll meet along the way.

The game's monsters are large, intelligent, and deadly—120 different varieties in all. Low-flying birds try to knock you from your horse. Gnomelike creatures attack you with pickaxes and throw rocks at you. (Their aim is deadly.) Dragons breathe fire at you. As for the demon himself, well, suffice it to say he is an awesome creature more than half a screen tall.

In order to defeat the monsters, you'll have to develop a different strategy for dealing with each one. Whatever approach you adopt, try to keep your hero as far away from the monsters as possible. Never let them back him into a corner. In fact, sometimes, it's better to try to avoid a monster rather than attack it. However, killing the monsters has some advantages—sometimes they carry potions that your hero can collect for later use.

The three potions that are most helpful are Shield potions, Zap potions, and Heal potions. The Shield potion makes the hero immortal, but only for three seconds. Zap potions will kill the monsters around the hero or at least take away some of their power. Because of their constitution, some monsters have some immunity to the Zap potion. It's interesting trying to figure out which monsters are which.

The Healing potion is the most helpful. It will cure all your hero's wounds and restore his energy to the maximum. He'll need it. There are more monsters waiting on the next level.

Onscreen graphics help you keep track of the hero's energy level and the number and type of potions he has remaining. Unfortunately, there is no indicator for the monsters' strength, so you're never sure how close to death they are. You'll have to keep hitting, jumping, running, and punching until you defeat them. This is made more difficult by the fact that the monsters seldom attack alone. Sometimes your hero will be outnumbered two or three to one. So use those potions carefully! The game will really put your joystick skills to the test.

You'll need more than just dexterity to master this one. The exploration levels of the game will take the hero through murky caves, pagan temples, and elaborate castles. You'll need to make good maps of some of these levels, or you'll never get our hero out of the labyrinth of passages.

The game isn't perfect; there are some flaws in it. One is the lack of a feature to save your game or position. This feature is available for other systems but not for the Commodore version. Another drawback is the manual. It's sketchy at best and was written to encompass all versions of the game. The manual tells you more of what the Commodore version can't do than what it can.

The biggest drawback I found was the loading time both to start the game and between scenes. Even using my Epyx FastLoad cartridge, the loading time ran anywhere from 30 seconds to a minute. At the rate I was dying and having to restart the game, I wished it would reload faster.

However, I have never seen a Commodore game that has offered such superb graphics, intricate plotting, and fast action. It shows what the 64 can do with the right programming. Let's hope more such games are headed our way.

MARTI PAULIN

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FEEDBACK

Questions and answers about TurboDOS, Commodore's support for the 64, and more

Bug-Swatter

TurboDOS (June 1993) doesn't work on 1541-II drives. Author Hong Pham offers the following suggestion to fix the problem. First, load and run TurboDOS. Then after the startup message appears, enter the following line in immediate mode.

POKE 4508, 234: POKE 4509, 234: POKE 4510, 234

To save this modified version of the program, type *BSAVE "TURBODOS.MOD",8,2049, 10493.*

In Scarce Supply

What's the word on the 64? Does Commodore still support it or not?

RAYMOND MAY
PALATKA, FL

Commodore still supports the 64 in Europe, but not in the U.S., according to Fred Bowen, a senior engineer at Commodore. The company has entered into an agreement with Software Hut (800-932-6442) to sell new and refurbished 64s, drives, and other equipment, and The Software Management Group (410-992-9975) will offer postsale support to Commodore resellers, various dealers, and end users. Service centers will work with SMG for all warranty-related activities. SMG has its headquarters in Columbia, Maryland, but plans to open offices in West Chester, Pennsylvania, and Memphis, Tennessee.

Appending Programs

I have a couple of financial programs that I have created over the years that I would like to combine into one larger program. I'd like to use a menu subroutine to run whichever program I desire. A couple of these programs are fairly long, and I'd rather not have to type them in again. Isn't there some way I can merge these without having to retype them?

DARRELL HUNLEY
WACO, TX

The easiest way to combine several programs is to append one to the other. This means that you'll have to change the line numbers of the second program so that its lowest number is higher than the highest number of the first program. This simply means that the programs with high line numbers are tacked onto the end of programs with low line numbers. If the line numbers overlap, you'll have a problem.

The easiest way to append programs is to load the first program and then in direct mode type POKE 43, PEEK (45)-2: POKE 44, PEEK (46) *and press Return. Then load the second program and type* POKE 43, 1: POKE 44, 8 *and press Return.*

List the program, and you should see that the second program has been appended to the first. Save this new program. If you wish to append another, repeat the process.

If PEEK(45) should happen to be a 0 or 1, you'll get an error massage. If this happens, you have to change your instructions by typing POKE 43, PEEK(45)+256-2: POKE 44, PEEK(46)-1 *and then continuing as before.*

Merging two programs into a single program with lines sorted correctly requires something else. This is different from appending one program onto another. You might have a subroutine that you've written, and you'd like to enter it without having to rewrite it. You can use the following program to merge two programs. Just make sure that neither program contains the same line number as the other.

```
SC 59000 FOR J=40960 TO 49151:
         POKEJ,PEEK(J):NEXT
AQ 59010 POKE42231,56:POKE4228
         8,96:POKE42585,96
BK 59020 FOR J=830 TO 900:READ
          V:POKEJ,V:NEXT
MJ 60000 DATA 162,8,32,198,255
         ,32,207,255,32,207,25
         5,165
GM 60010 DATA 1,41,254,133,1,1
         60,0,32,207,255,32,20
         7
AP 60020 DATA 255,240,32,32,20
         7,255,133,20,32,207,2
         55,133
PS 60030 DATA 21,32,207,255,15
         3,0,2,240,3,200,208,2
         45
XQ 60040 DATA 152,24,105,5,168
         ,32,162,164,76,79,3,1
         65
BF 60050 DATA 1,9,1,133,1,32,8
         9,166,76,128,164
```

To use this merge routine, load it, run it, and then type NEW. *Be patient; it will take almost a minute after you type* RUN *before the computer will be ready again.*

Then type in or load a BASIC program. Merge additional programs on disk by typing OPEN 8,8,8,"FILENAME": SYS 830. *Filename is whatever program you have on disk that you want merged with the one already in memory. Be sure to save the newly merged program. You can turn off the blinking light on the disk drive by typing* OPEN 15,8,15,"I": CLOSE 15.

Author Information

You should publish the addresses of your authors so we can write to them. Also, you should include more biographical information such as age, sex, hobbies, and nationality.

Also, are you guys going to sell any more disk products? I notice that you have a few different disk indexes. Why don't you combine them into one?

If you have public domain programs on your disk but don't pay the authors, then your corporation is freeloading off of them. Is your disk still going to publish bonus programs that are too large to type? What about graphics? Do you still want them?

HENRY WILLIAMS
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FEEDBACK

Information about authors, possible public domain ripoffs, a directory lister, and SpeedCalc

Gazette forwards mail to its authors whenever a reader writes with a question about a program that our staff cannot answer. We also forward any mail that's sent to an author in care of the magazine. We include biographical information whenever an author supplies it, but it's not required. (As a matter of fact, you didn't include your city or province in your letter, but we identified the country from the stamp on the envelope.)

Like many other companies that offer Commodore products, we too have noticed sluggish sales. That is one reason that there are no plans to update the Gazette Index. The Index was a cumulative one, however. That is, we updated it each year, adding on to the previous contents. The Index includes programs and articles from 1991 back to 1983. At this time, there are no plans to update it again.

While SpeedScript itself hasn't changed since its last disk, we have published a number of enhancement programs. We have thought of offering a disk of those products. We have also thought of offering a two-disk set of Larry Cotton's "Beginner BASIC" columns and programs. At this time, we doubt if there is enough interest in these products to make them economically feasible. If we're wrong, we welcome your comments.

If you've read Tom Netsel's comments in this issue's "64/128 View," you know that there are major changes coming to Gazette. The decision to go to an all-disk product means several benefits to our readers. Since you no longer have to type in our programs, we don't have the same limits on program size. We also won't have the 16-page restriction that we've had in print. We can now offer more programs as well as larger ones.

Steve Vander Ark has found some very good public domain and shareware programs for our disk. We plan to continue with his "PD Picks." As for ripping off those authors, we do our best to contact them before publication. We offer a contract that grants us the one-time use of their programs, and we also pay an honorarium for that use. Whenever we include a shareware program, we hope that you'll do your part by sending the authors a few dollars for the programs that you find useful.

While we still receive a large number of program submissions, we get almost no graphics these days. We can only assume the number of active Commodore artists has declined. Also, since we received no feedback about our dropping "Gazette Gallery" from the disk, we assumed that you readers didn't miss that feature either.

Directory Lister

Here is a directory lister for the 64 that I use all the time in my programs, and I find it quite helpful. Other readers who program may find it useful as well. This program will read the directory of drive 8, 9, or whichever one you specify without interrupting or losing the program that currently is in memory.

```
10 PRINTCHR$(147):
   INPUT“DRIVE 8 OR 9”;DN
20 PRINTCHR$(147):
   PRINTTAB(6)“DISK
   DIRECTORY”;DN
30 SYS57812 “$”,DN: POKE 43,1:
   POKE44, 192: POKE768, 174:
   POKE 769, 167: SYS47003,1
40 POKE782,192: SYS65493:
   SYS42291:LIST:POKE 44,
   8: POKE 768, 139: POKE 769,
   227
50 PRINT: PRINTTAB(6)“ HIT ANY
   KEY”
60 GETA$: IF A$=“” THEN 60
70 RETURN
```

Renumber the routine to fit anywhere within your program, and be aware that line 70 will need a GOSUB in order to work properly.

DAVE WASENDORF
DENVER, CO

Where's SpeedCalc?

I the June issue there's a notice about a bonus template for use with SpeedCalc for tracking stock holdings. Before I ordered the disk, I checked to see if I had SpeedCalc. When I couldn't find it, I booted the Gazette Index to see when the program was published. I didn't find any mention of it. I could use this template if I had SpeedCalc. When was it published?

RAY MUSICK
OKLAHOMA CITY, OK

The reason you couldn't find SpeedCalc on the Gazette Index disk is because SpeedCalc was never published in Gazette. It appeared in the January 1986 edition of COMPUTE. (Remember the good old days when COMPUTE published type-in programs for the Commodore, Apple, IBM, and Atari?) It was also available on disk.

A few years later, we issued the Gazette Productivity Manager disk ($14.95). In addition to a financial planner, and data base, this disk contained GemCalc, a spreadsheet based on Speedcalc but much larger and powerful. Files and templates for these two programs are compatible, however. If you don't already have a spreadsheet, you might want to consider GemCalc. It's a great buy, and the disk is still available.

Since SpeedCalc was never published in Gazette, maybe it's time to correct that oversight. Look for it in an upcoming issue of Gazette. ☐

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PD PICKS

Steve Vander Ark

SLEEP STEALERS

I'm still on a games kick this month. As you might recall, last month I was trying to beat Super Rockfall and Zix. Now, I've added two more great new games to my "sleep-stealer" disk. Both of these games are excellent. They're the kind that keep me staring at the monitor until my eyes start to creak. These aren't joystick breakers; they're strategy games. They're the kind that keep you up until 3:00 a.m.

Now, here's this month's pair of winning programs. For those of you on CompuServe, I'll include the game's filename whenever I can find it. Whether you get these games on Q-Link, GEnie, CompuServe, or Gazette Disk, don't count on getting too much sleep once you start to play.

Don't count on getting much sleep when you boot either of these great PD games.

Rebellion V2.

Q-Link filename: REBELLION V2. Uploaded by Ravenweird. GEnie file number: 12546.

This game bears a passing resemblance to Risk, the board game in which you try to conquer the world using little colored markers for armies. You are given a random map made up of hexagonal territories which come with villages and a contingent of soldiers loyal to the king. Of course, as you might guess from the name of the program, you aren't loyal to the king at all. In fact, your goal is to wipe out the royal troops entirely and proclaim yourself king.

The game consists of your maneuvering your armies, challenging neighboring territories, and trying to hoist your own flag over the territories. In the process, you can hire more soldiers and build towers and villages to extend your influence.

That by itself would make for a pretty neat game. But Rebellion also offers tidbits of color and style that make all this simulated mayhem a lot of fun. Every time there's a battle, for example, a window appears showing two or more little guys armed with swords who proceed to duke it out. This action is accompanied by thunks and clangs and martial music. There are no blood or explosions (this is a strategy game, remember?), and you really can't do anything to help your side win. But these kinds of frills add a lot to the overall enjoyment of Rebellion.

There are other nifty touches. You can customize the game extensively at the start. You can edit the map and select your own color and coat of arms, and they then appear on your battle flags and in your conquered territories.

You can permit random events to occur, such as fire destroying one of your villages or your troops capturing some outlaws and gaining some extra gold. You can also (and I need options like this) make the king's men into real wimps or give the king extra advantages such as a brother to charge to his rescue. Rebellion will suit just about any kind of challenge you want to set up, and it'll keep you busy a long, long time.

If you do happen to tire of treachery and bloodshed, you might want to load the other program for this month, a wonderful re-creation of an ancient but still popular game.

Mah-Jongg by Kurt Tappe.

Q-Link filename: MAH. JONGG V2.SDA. Uploaded by KurtTappe. GEnie file number: 7584. CompuServe filename: MAHJON.BIN. Contributed by user #73040,504.

According to the nice bit of historical background Kurt Tappe has included with this game, people have been addicted to mah-jongg for thousands of years. Now in the computer age, the deceptively simple game is still keeping people like me from getting any work done. This version, for the 128 in 40-column mode, is a masterpiece.

In case you're not familiar with the original board game, here's a brief idea of what it's like. You are presented with a number of little tiles with pictures on them, stacked up in a random arrangement, with extra pieces in the middle. Your job is to remove matching tiles from those that are visible. The trick is that you can take only tiles that have a free edge. In other words, you can't remove those that have other tiles touching all four sides. Computer versions of mah-jongg automatically set up the tiles in a random arrangement to start you off and then let you select matching pairs with a pointer.

Kurt has gone out of his way to make his mah-jongg the best around. He has included a mouse driver. Since you have to move the cursor all over the screen, the game benefits from the mouse's quick pointer control. Kurt has also provided an option that makes guys like me happy: the chance to take back moves and try another tack. You can even ask the computer to suggest moves for you.

One feature that I don't dare use is the autoboot creator, included as a separate utility program. I play mah-jongg too often as it is without having it there every time I start my system!

You probably won't really need the documentation which is available from within the program, but read it over anyway to get the historical goodies on mah-jongg. That's just one more example of the level of user friendliness that you'll find in this game. Kurt has gone the extra mile to ensure that this program becomes one of your favorites; it definitely is one of mine. ☐

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BEGINNER BASIC

Larry Cotton

THREE CHALLENGES

Merry Christmas, happy Chanukah, or season's greetings. Here are a few BASIC programming challenges that I'd like for you to consider while Gazette makes the change from paper to disk. Give them some thought and see if you can program a solution ot two.

Last weekend my seven-year-old second cousin Hunter showed me a game which I had never seen before. It's called Sets. In case you're not familiar with this game, I'll tell you about it. It's a fiendishly simple game in which a deck of special cards is shuffled, and 12 cards are displayed face up in a 3 by 4 grid. Each player takes turns identifying and collecting sets of three cards. More cards are added to the grid to replace the sets as they're removed.

A set is defined as any three cards which share certain characteristics. For instance, one solid red diamond, one solid blue diamond, and one solid green diamond would qualify as a set. Similarly, one shaded green oval, two shaded green ovals, and three shaded green ovals would make a set. Less easy to spot are sets which might consist of one solid red diamond, two green shaded diamonds, and three blue open diamonds.

If only two cards in a group share a certain characteristic, the group isn't a set. This isn't a set: two shaded green ovals, two solid green diamonds, and two open red squigglies. (One way to legalize that set would be for the green diamonds to be blue.) The variables in a set are color (red, green, or blue), quantity (one, two, or three shapes), fill (open, shaded, or solid), and the shape itself (squiggly, oval, or diamond).

Needless to say, Hunter beat me soundly most of the time. So what's the programming challenge that I mentioned earlier?

As you sit around the house on these long cool nights, see it you can write a computer program that plays a Sets-like game. (Is there already one out there?) Ideally, the computer would randomly present the 12 cards, the player would attempt to identify a set, and the computer would decide whether or not the set is legal.

An alternative could be that the computer presents groups of three cards, the player decides whether the group is a legal set or not, and the computer checks the answer. Either way, I would like to see how you would begin programming a game such as this in BASIC.

Feel free to come up with your own variation. Send me the game (finished or not) in care of COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. I'll try to decipher your programming and present some of your best techniques in a future column. Meanwhile, I'll attempt to come up with a version of my own, and we can compare programming strategies later.

Here's another challenge for you: Write a short BASIC program that will play the Westminster chimes. These are the familiar chimes heard in large clocks that ring on the quarter-hour. It's not sufficient to let the SID chip just play the notes; rather, SID should really chime! In other words, this program should use the ring mode feature of the SID chip to add the harmonics necessary to sound like real bells. Even better would be a clock which chimes four notes on the quarter-hour, eight on the half-hour, and so on until the hour. (Hint: try poking a 21 to one of SID's control registers.)

Incidentally, some other well-known chimes are Winchester (not actually played in that city), Canterbury (not actually played at Canterbury Cathedral), Trinity, Guildford, St. Michaels, Cairo, and Notre Dame. As a bonus, you could include them all with a menu screen. Hit T for Trinity, G for Guildford, and so on!

OK, here's the third challenge, one which fits the real spirit of "Beginner BASIC." Send me a short BASIC program that rounds numbers. One might let a user enter any number that included unlimited decimal places. The user could then choose the number of decimal places to round off to.

Here are three programming challenges to keep you busy during the holiday season.

I would also like to see any programs which round money calculations to two places, preferably with the ability to line up decimals vertically. I'll look at any program that computes averages, golf scores, lottery winnings, calories, grades, or whatever else you want to count!

Way back in the August 1988 issue of COMPUTE!'s Gazette, I showed how to use the following general formula to round numbers.

```
R = INT(N*10↑D+.5)/10↑D
```

R is the rounded number that you seek, N is the number to round, and D is the number of decimal places you'd like to round off to. The up-arrow key (next to Restore) raises a number to a power.

If D were 2, 10 would be raised to the second power, or squared. Feel free to adapt this formula to any new program you're inspired to write. And keep those cards and letters (and programs) coming. Be sure to include your name and address with all submissions. ☐

D'IVERSIONS

Fred D'Ignazio

I DON'T THINK THIS IS CLEVELAND EITHER, TOTO!

In *Rising Sun*, the movie based on Michael Crichton's best-selling novel, actor Wesley Snipes, playing a police detective, watches a computer screen in wonder. He sees his head and the head of his partner (played by Sean Connery) cut from their own bodies and pasted onto each other's shoulders. Following this demonstration, Snipes is cautioned by a computer technician not to trust videotaped events as evidence of something that has actually taken place in the real world.

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Moviemakers have used special effects for years to make us believe the events that we see on the silver screen, or at least to make them seem believable. Of course, it usually takes a hefty budget and a team of artists to create this video magic.

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Many of us, outfitted with power gloves, stereo computer goggles, bodysuits, and ultra-high-speed computers, eagerly await the dawn of virtual reality. But a simpler form of virtual reality has already dawned, and you are liable to stumble across it in the checkout lines of your local supermarket or convenience store.

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"TREE GROWS FROM BOY'S MOUTH—LAD REMEMBERS SWALLOWING ACORN ON FOURTH BIRTHDAY"

Thousands of stories similar to these appear each week in America's supermarket tabloids. Many of them are accompanied by photographs depicting the event they describe. You might see the groom holding his diminutive bride in the palm of his hand or an oak tree growing out of a boy's mouth. The photographs are used to "prove" that the fantastic events did occur and were not concocted by an editor with a bizarre imagination.

Don't count on it. These photos can be quickly and easily created by digitally manipulating the original photographs on computer workstations.

For three years I worked with Sharon Goth-Tew in the Teacher Explorer Center, a multimedia demonstration center sponsored by the State of Michigan to show educators some of the exciting advances in instructional technology. Sharon and I delighted in showing the headlines from grocery story newspapers to educators and then demonstrating how the pictures could be digitally created.

For example, Sharon had a digitized image of her son Tyler which she called up on the big four-foot Sony monitor at the front of the room. She loaded Tyler's image into a paint program and proceeded to shrink him, stretch him, invert him, rotate him, and colorize him. She showed how she could digitally add an earring on Tyler's left ear, give him a case of the measles, or change the color of his hair or his eyes. She also showed how she could shrink his entire face and place it inside his mouth or stretch his mouth so that it could cover the TV screen. Since Tyler would not be pleased with the things his mom was doing to his face, Sharon always asked the teachers to keep her tricks secret.

Each morning we greeted a fresh crop of educators from Michigan and around the country. Our first warm-up activity was to divide the educators into five teams and to capture their images digitally on their workstation computer. We used a video camera connected to a computer frame-grabber board. Since we were on a network, as soon as the images were captured, we displayed them in an instant computerized slide show on the classroom TV.

Then the fun began! The class giggled, shrieked, and roared as we took men's heads and placed them on female bodies and as we added clip art backgrounds and placed teachers on the moon, at the bottom of the ocean, or in a fifteenth-century castle.

We changed hairstyles, added hair to bald heads, and drew clown hats. When we replicated arms, legs, and other body parts, we attached them to people's bodies like cut-out paper dolls. We then added mock headlines and published the text and pictures on the classroom printer to create our own imitation tabloids.

One morning, Deb Small, the number two technology official in the Michigan Department of Education, came to the center to see what we were up to. We told Deb we were digital magicians who had the ability to transport her to star in her favorite movie. After looking through our collection of laser discs, Deb decided that she wanted to swap places with Judy Garland and become Dorothy in *The Wizard of Oz*.

Sharon did all the digital surgery while Deb selected images. First they captured keyframes from the laser disc. These formed a storyboard of the movie. Next, they digitized a picture of Deb as she sat in front of one of the video cameras in our laboratory.

Sharon cut the head off Deb's picture and pasted it onto Dorothy's shoulders in *The Wizard of Oz*. By just cutting the oval of Deb's face and scaling it appropriately for each picture, Sharon was able to fit Deb's face onto Dorothy's without mussing a single one of Dorothy's hairs. Then Sharon went into fat bits mode and smoothed the pixels around the oval to make the transition from Deb's face to Dorothy's face subtle and natural.

To complete the effect, Sharon and Deb composed a digital slide show that included all the photographs from the storyboard. They added the song "Somewhere Over the Rainbow" from the movie as background music and dialogue such as "Toto! I don't think we're in Cleveland anymore!" (Deb and her family come from Cleveland.)

They copied the computer slide show onto videotape and created a customized label. Deb carried the finished product out of the center after only a morning's worth of work. Deb was so pleased with the video that she sent it to her mom and dad back in Ohio!

So, the next time you hear a sound, see a photograph, watch a news documentary, or listen to someone's voice, ask yourself, Is it real or is it virtual reality? We live in a society saturated by electronic media.

In the past this media accurately reflected the real world—or at least we could tell when it didn't. But the digital revolution is changing that. Almost everything visible through media windows may soon be something pasted together with digital smoke and mirrors. What effect will this have on the facts? What effect will it have on our perception of reality? Most important, will we care? ☐

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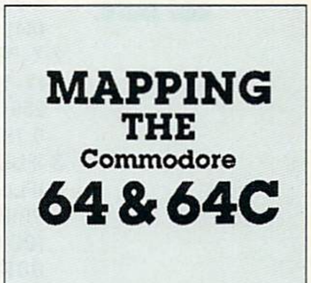
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PROGRAMMER'S PAGE

David Pankhurst

FAB FOUR

All the tips this month come from the computer of David Pankhurst. Look for more information about him at the end of this article.

Line Delete

In October's "Feedback" column, Roger Howard of Los Angeles asked about a program to delete a number of lines from a program. Here's a program to delete a number of lines from a BASIC program just by typing in five lines. It's handy when you want to erase lines but don't want to load in a complete system (like MetaBASIC). Feel free to use different line numbers. Just be sure to change the references in line 3 and line 4.

Delete a range of program lines, have fun with your telephone, and try to master a game with these tips and more.

```
1 INPUT“WHAT ARE LOW,
  HIGH LINE NOS.”;A,B:
  Y=PEEK(43)+256*PEEK
  (44)
2 X=PEEK(Y)+256*PEEK
  (Y+1): L=PEEK(Y+2)+
  256*PEEK(Y+3): IFX=
  0 THEN END
3 IFL<ATHENY=X:GOTO2
4 IFL<=BTHEN
  PRINT“[CLR][3 DOWN]”L“
  [DOWN]Y=”Y“: B=”B“:
  GOTO2:[HOME]”
5 POKE198,2:POKE631,13:
  POKE632,13:END
```

Run Counter

This trick is a one-liner to embed a counter in a program. I find this line is useful to note the version of programs I'm developing. Every time I run the program, it passes this line, incrementing the counter. Later versions will have higher numbers.

The first line shows how it looks in BASIC; the second shows how you can type it so it will fit on one line. The second version uses the Commodore technique of two-letter abbreviations. This consists of entering the first letter and holding down the Shift key while entering the second.

```
1 R$=“0000”: FORI=7TO
  10: POKEI+PEEK(61)+256*PEEK
  (62)-20,ASC(MID$(STR$(VAL
  (R$)+1+1E8),I,1)):NEXT
```

```
1 r$=“0000”:fOi=7to10:
  pOi+pE(61)+256*pE(62)-20,
  aS(mI(stR(vA(r$)+1+1e8),
  i,1)):nE
```

It's a Call 4 U

This routine takes a telephone number and gives letter combinations that can be used for it (such as 555-JOJO instead of 555-5656). What makes this one worth typing in is that it does all combinations, not just a random sampling. Also, it's only five lines, which is enough for something as trivial as this. You can enter any nonnumeric characters you want, and they will be included in the output. Note that line 50 has all the letters in the alphabet except *Q* and *Z*.

```
10 INPUT“NUMBER”;A$:B=
   LEN(A$):DIM C(B):
   FORD= 1TOB:C(D)=0:
   NEXT: C(B)=1:PRINT,,,
20 E=B:PRINT,
30 C(E)=C(E)+1:IF C(E)>2
   THEN C(E)=0: E=E-1: ON
   SGN(E) GOTO 30:END
40 FORD=1TOB:F$=MID$
   (A$,D,1):G=3*VAL(F$)-5:
   IF G<1 THEN PRINT
   F$;: C(D)=5:NEXT: GOTO
   20
50 G=G+C(D):PRINT MID$
   (“ABCDEFGHIJKLMNO
   PRSTUVWXY”,G,1);:NEXT:
   GOTO 20
```

Master This

This little program provides a quick version of the popular guessing game called Mastermind. Here, you guess at the digits in a four-digit number (digits 1–6), and the results are displayed with B (black) for the number of digits that are correct and in the correct position and W (white) for digits that are correct but in the wrong position.

If you want to try different variations, adjust line 10. L is the number of digits in the puzzle (4), and R is the range (from 1 to 6 in this case).

```
10 L=4:R=6:FOR I=1TOL:
   D(I)=INT(RND(0)*R+1):
   D=D*10+D(I): NEXT:Z=1:
   GOTO30
20 Z=Z+1: PRINT“B=”B“W=”W
30 PRINT“GUESS=”Z:INPUT X:
   PRINT“[UP]”,: FOR I=LTO1
   STEP-1: Y=INT(X/10): G(I)=
   X-Y*10:X=Y
40 NEXT:W=0:B=0: FOR I=1TOL:
   F(I)=D(I): IF G(I)=F(I)THEN
   F(I)=0: G(I)=-1: B=B+1
50 NEXT: FOR J=1TOL: FOR
   I=1TOL: IF F(J)=G(I)THEN
   F(J)=0:G(I)=-1: W=W+1
60 NEXT:NEXT:IF B<L THEN 20
70 PRINT“CORRECT!”:END
```

Editor's note: For many years Randy Thompson has compiled the material for "Programmer's Page," and he's done an outstanding job. His work load as a programmer for a major software firm, however, has forced him to give up this column. We wish Randy well and want to convey to him our thanks for his many great programming tips and ideas.

Although Gazette is changing, "Programmer's Page" will continue to be a vital part of it. David Pankhurst, a talented programmer from Montreal, Canada, provided the tips for this issue, and he will be compiling the column from now on. Look for more information about David next month.

Remember, Gazette still wants your programming tips and hints. We pay $25–$50 for each tip that we publish. Send your tips to Programmer's Page, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. ☐

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GEOS

Steve Vander Ark

ULTIMATE GEOS ON A BUDGET

An ultimate GEOS system is great if you can afford it. Here's what you really need.

About a year ago in this column, I described what I considered to be the ultimate GEOS setup. The total price was several thousand dollars. Later, I received letters from people who asked about a system for regular folks. Fancy equipment is wonderful, but is it necessary? So here's another, more realistic, list of what I consider to be the best choices for a GEOS system.

Computer and monitor. I recommend a 128 for its 80-column screen. The ease of use in 80 columns, especially with geoWrite, is well worth the extra money. That means you need an 80-column monitor, too, but you can get by with monochrome. I'd also recommend a small color TV to display your 40-column screen. I speak from experience here; I have that exact setup.

Drives. To really use GEOS effectively, you need at least two drives. I'm going to go the extra mile and say that you have to have a RAM expansion unit for one of them. I'll talk a bit more about RAM in a moment. For now, let's assume at least a 512K REU along with your 1541 or 1571 real drive.

Many users also add a 1581 drive. Since I've never owned one, I can't say much about it except that it would be nice. Some other users have a hard drive on their systems. If you can afford one, go for it! I can't afford one of those, either, but from everything I've heard and read, the hard drive of choice is one from Creative Micro Designs (CMD). If it comes down to a choice, though, definitely get a RAM device before a hard drive.

RAM devices. As I have often said, I consider a RAM device to be essential to running GEOS. It is the single most important piece of hardware you can buy. A RAM device is more important than a second disk drive, a hard drive, a fancy monitor, or anything else.

I wouldn't hesitate to say that it's better to run GEOS on a 64 with a RAM device than on a 128 without. And while a 1750 or geoRAM may be considered a minimum level of RAM, I highly recommend getting RAMLink from CMD. Order it packed with as much RAM as you can afford, a battery backup, and (if you feel like splurging) a Real-Time Clock. While you're at it, order a copy of Gateway, even if you don't plan to run your system under it. I'll explain more about that later.

Input devices. A mouse—period.

Software. For a file manager, you'll do fine with the deskTop that comes with GEOS, but I recommend Gateway. I wouldn't want you to be stuck with RAMLink without Gateway to make full use of it. You'll want Gateway if you plan to use DualTop or geoSHELL, too.

By starting with Gateway, you allow DualTop and geoSHELL to access native mode partitions on RAMLink. What that means is that you can create a RAM disk without having to match the size and structure of another drive type, such as a 1571 or 1581. If you stay in Gateway, you can even use subdirectories, which are a very convenient way to organize your files.

You can usually fill your application needs with actual GEOS products: geoPublish, geoFile, and so on. All GEOS software is now available through CMD. There is a multitude of essential public domain or shareware programs, so a subscription to QuantumLink or GEnie is also a good idea. This gives you access to those file libraries. If you want suggestions on which public domain files are good, check out some of my columns over the past few years. I'll put a new list of the best GEOS downloads in an upcoming column as well.

There are a number of third-party products which you should consider, although the ones you buy depend on how you plan to use GEOS. If you want great printouts from geoWrite, for example, you need Perfect Print. Perfect Print won't help you a whole lot for desktop publishing with geoPublish, though.

No matter how you spend your GEOS time, you'll want geoWizard and the other utilities on the Collette Utilities Disk. All of these programs are available through CMD, which is now the source for all the official GEOS products.

Printer. Get an Epson-compatible, and make it a 24-pin. Oh, I know that you can make do perfectly well with a 9-pin printer, but the better printouts with the 24-pin model make it worth the extra dollars. Remember, a lot of your work in GEOS will be geared toward some kind of printed document. I like the Epson LQ series myself, but I've heard a lot of great things about the Panasonic line as well.

Extras. Do you have any money left? Besides the Real-Time Clock I mentioned for your RAMLink, there are plenty of other ways to spend your GEOS dollars. If you're a graphics fan, you'll want to purchase geoCanvas (CMD) and Dave Ferguson's Dweezil Disks (Quincy Softworks, 9479 East Whitmore Avenue, Hughson, California 95326-9745). The games and utilities on the *RUN* magazine GEOS Companion and Power Pack disks are wonderful, and CMD now sells them as well. ❒

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MACHINE LANGUAGE

Jim Butterfield

BRANCHES AND JUMPS

A machine language program executes instructions sequentially. Three ways to change this flow are branches, jumps, and subroutine calls.

Branch instructions have a limited reach, jumping forward or backward up to 128 bytes or so. Branch instructions are conditional, which means the branch takes place only when certain conditions are met.

The jump instruction (JMP) can take you to any address in memory (absolute addressing). It's unconditional; the jump always takes you there.

Three ways to change the flow of a machine language program are through branches, jumps, and subroutine calls.

The jump-subroutine instruction (JSR) also uses absolute addressing. A link address will be left on the stack. When the subroutine has done its job, it can come back with a Return (RTS) command.

The eight branch instructions can be classified by what they test. Branch instructions test flags left when previous instructions were executed. There are four flags.

The Z (zero) flag is affected whenever a register (A, X, or Y) has been modified or after comparisons have been made. If a register ends with 0 as its contents, the Z flag switches on; with something other than 0, the Z flag is cleared. After a comparison, the Z flag is turned on if an equality is found. Branch-equal (BEQ) will make the branch if the Z flag is on. Branch-not-equal (BNE) will branch if the Z flag is off.

The N (negative) flag is affected whenever a register (A, X, or Y) has been modified or after comparisons have been made. The N flag will match the highest bit of the modified register. After a comparison instruction, the N flag is affected, but its meaning is complex. So it is seldom used in this way. Branch-minus (BMI) will make the branch if the Z flag is found to be on. Branch-plus (BPL) will branch if the Z flag is found to be off. Keep in mind that the highest bit of a byte is sometimes thought of as the sign bit. When the bit is on, the byte is negative.

The C (carry) flag is affected by arithmetic or shift instructions and after comparisons. The arithmetic and shift operations use this flag in its usual carry sense, meaning a bit has flowed out of the byte that's being manipulated. After a comparison instruction, the C flag is turned on if the register contains an equal or greater unsigned value. Branch-carry-set (BCS) branches if the C flag is on. Branch-carry-clear (BCC) branches if it is off.

The V (overflow) flag is affected by arithmetic instructions, add-with-carry (ADC), and subtract (SBC). Branch-overflow-set (BVS) and branch-overflow-clear (BVC) are the related instructions.

Let's write a short program to print *X* a number of times on a screen row. BASIC will poke the desired number into address $2100 (decimal 8448), and then put it into the X register, our counter. Here's the code, starting at address hexadecimal 2000.

```
2000 LDX $2100
```

The load X instruction changes a register; so the Z and N flags will be affected. We don't care, however, so we'll ignore the flags for the moment. Next, load A with hexadecimal 58, the ASCII value for *X*.

```
2003 LDA #$58
```

Again, Z and N are affected. Z will be off (nonzero value), and flag N will be off (high bit of A is off). Instructions BEQ and BMI wouldn't branch if we used them at this point. BNE or BPL would branch, but we don't use them yet.

```
2005 CPX #$00
2007 BEQ $200F
```

The compare X instruction will set up the Z flag. If the value in X is equal to 0, BEQ will cause the program to hop ahead. Why? Because no *X*'s are to be printed.

The code for the above BEQ instruction will be two bytes $F0 and 06. F0 means BEQ, and 06 means skip six bytes if the branch is taken.

```
2009 JSR $FFD2
200C DEX
200D BNE $2009
```

Our loop jumps to the print subroutine at $FFD2 and decrements the X value by 1. The DEX instruction modifies the Z flag according to whether the result in X is 0 or not. If not, BNE takes us back around the loop. If X is 0, we've finished printing this line.

```
200F LDA #$0D
2011 JMP $FFD2
```

We end the line of *X*'s by printing a Return character ($0D). This time we jump (JMP) to the printing subroutine, rather than using JSR. When printing ends, we return to whatever called our ML program—in this case, it was BASIC.

Here's the code in BASIC. It draws a graph of Y=X*X.

```
100 DATA 174,0,33,169,88,
    224,0,240,6,32,210
110 DATA 255,202,208,250
120 DATA 169,13,76,210,255
200 FOR J=8192 TO 8211
210 READ X:T=T+X
220 POKE J,X
230 NEXT J
240 IF T<>2814 THEN STOP
300 FOR J=-6 TO 6
310 POKE 8448,J*J
320 SYS 8192
330 NEXT J
```

❐

CHAIN REACTION

By Graham Fyffe

You're in charge of a nuclear reactor, and it's malfunctioning. It's up to you to prevent a meltdown. The radioactive atoms keep spewing out of the reactor, but you can contain them in a lead-lined vessel. But watch out! If the vessel overflows, it'll destroy the reactor!

Getting Started

Chain Reaction is made up of four programs: a BASIC boot program or loader, a machine language program, graphics, and the main BASIC program. To help avoid typing errors, use The Automatic Proofreader to enter the BASIC programs; see "Typing Aids" elsewhere in this section. Be sure to save the programs on the same disk and with the proper filenames because the boot program loads those programs automatically. Also, you may want to use BASIC abbreviations for some of the commands when you enter lines 80, 140, and 150 of the main program. These lines fill two entire screen lines.

CHAIN.ML and CHAIN.CHARS are written in machine language. To enter these programs, use MLX, COMPUTE's machine language entry program; again, see "Typing Aids." Enter the following addresses for CHAIN.ML when MLX prompts.

Starting address: C000
Ending address: C1FF

Enter the following addresses for CHAIN.CHARS when MLX prompts.

Starting address: 8200
Ending address: 84F7

Be sure to save these programs before you exit MLX.

Playing the Game

To start Chain Reaction, load and run CHAIN.BOOT. After a few seconds, the screen should turn black, and then you should see the message *LOADING CHAIN REACTION*. You'll then see the title screen, the level of gameplay, and a bunch of colorful dancing atoms.

To change the level of gameplay, press f1. To start the game, press Return. To pause the game at any time except during a reaction, press the up-arrow key that's next to the Restore key. Press this key again to resume play. To quit during a game, hold down the Shift key and press Clr/Home.

At the start of the game, a colored atom will wobble out of the reactor onto a bar that extends over the containment vessel. You have a limited time to move the atom left or right with the joystick before the atom drops into the vessel. You can press the joystick button to make the atom drop ahead of time. Any atoms touching atoms of their own color will explode, making additional room in the vessel. If an atom explodes beneath another, the top atom will drop down. If you plan out a careful strategy, you may get dozens of atoms to explode with a single drop. The object of the game is to prevent the vessel from overflowing.

The Levels

On the practice level, there are no obstacles in your way. On the easy level, a green accelerator beam streaks across the vessel after each drop. If it comes in contact with anything, it will change whatever it hits into an atom of a random color.

On the moderate level, a blue block appears in the vessel after each drop, but the green beam will sometimes clear them out of the way. The beam never clears out the second row from the top, so it can fill up with blocks.

On the hard level, there are no green beams, only blue blocks. The vessel fills up fast, but you'll always have the top row to work with because blocks never land on it.

Scoring

When an atom explodes, your score increases by the number of atoms in a row that have exploded so far. Scoring also depends on the level of play. You get no points for practice rounds. Easy rounds earn you regular points. Moderate rounds earn you three times as many points as easy, and hard rounds earn you five times as many points as easy rounds.

The game keeps track of your score, how many atoms have exploded, and the high score of the day. These scores are kept to the right of the containment vessel.

CHAIN.BOOT

```
PK 5 REM COPYRIGHT 1993 - COMP
     UTE PUBLICATIONS INTL LTD
      - ALL RIGHTS RESERVED
RX 10 B=B+1
EK 20 IFB=1THENFORT=0TO7:POKE3
      2768+T,0
DX 30 IFB=1THENLOAD"CHAIN.CHAR
      S",8,1
DR 40 IFB=2THENLOAD"CHAIN.ML",
      8,1
JX 50 POKE53281,0:POKE53280,15
      :PRINT"{BLK}{CLR}";
DD 60 POKE52,128:POKE56,128:CL
      R
KF 70 POKE56576,(PEEK(56576) A
      ND 252) OR 1
DP 80 POKE53272,32
XC 90 POKE648,136
PE 100 POKE56334,PEEK(56334) A
       ND 254
RB 110 POKE1,PEEK(1) AND 251
QS 120 FORT=8TO512:POKE32768+T
       ,PEEK(53248+T):NEXTT
DS 130 POKE1,PEEK(1) OR 4
BR 140 POKE56334,PEEK(56334) O
       R 1
AM 150 POKE53270,PEEK(53270)OR
        16
DM 160 PRINT"{CLR}{WHT}LOADING
        {CYN}CHAIN REACTION"
KB 170 A$=CHR$(34):PRINT"{BLK}
       NEW"
KX 180 A$=CHR$(34):PRINT"
       {DOWN}LOAD";A$;"CHAIN.B
       AS";A$;",8"
PS 190 PRINT"{4 DOWN}RUN{7 UP}
       ";:POKE198,0
EJ 200 FORT=631TO633:POKET,13:
       NEXTT
FH 210 POKE198,3
```

CHAIN.BAS

```
PK 5 REM COPYRIGHT 1993 - COMP
     UTE PUBLICATIONS INTL LTD
      - ALL RIGHTS RESERVED
JM 10 REM SETUP
QR 20 POKE53281,0:POKE53280,0:
      POKE53282,11:POKE53283,1
      :GETA$:GETA$
XP 30 DIMAG(8,9):PRINTCHR$(8)
QB 40 S=54272:FORT=STOS+24:POK
      ET,.:NEXTT:POKES+5,9
ES 50 ZA$="CCCCCCCCCCCCCC":ZB$
      ="{HOME}{5 DOWN}":ZC$="
      {DOWN}{5 LEFT}":ZD$="
      {6 RIGHT}":ZE$="
      {7 SPACES}"
GA 60 ZF$="000000":ZG$="
      {5 SPACES}{4}A**********
      ****A":AT$="NO{DOWN}
      {2 LEFT}PQ{OFF}{WHT}{UP}
      ":BL$="{7}{N}{Q}{DOWN}
      {2 LEFT}{D}{Z}{UP}"
GE 70 CO$(1)="{2}":CO$(2)="{3}
      ":CO$(3)="{4}":CO$(4)="
      {5}":CO$(5)="{6}":CO$(6)
      ="{8}"
EP 80 SC=0:AT=0:FORT=1TO7:FORI
      =1TO8:AG(T,I)=.:NEXTI:NE
      XTT:DI=1:DS=0:BA$="{OFF}
      {2 SPACES}{DOWN}{2 LEFT}
      {2 SPACES}{UP}"
KK 90 DI$(1)="PRACTICE":DI$(2)
      ="EASY":DI$(3)="MODERATE
      ":DI$(4)="HARD"
DH 100 R=0:V=0:C=2:DE$="N":XP$
       ="{RVS}{4}LM{DOWN}
       {2 LEFT}NO"
QJ 110 REM DRAW SCREEN
KM 120 PRINT"{CLR}{4}{OFF}
       {3 DOWN}"SPC(22)"IJJK"Z
       C$"FLMMH"ZC$"G {3}NO{4}
       H"ZC$"G {3}PQ{4}H"
GD 130 PRINTZG$ZA$"CCCCC";
XJ 140 FORT=1TO16:PRINT"
       {5 SPACES}B"SPC(14)"B":
       NEXTT:PRINT"{5 SPACES}D
       "ZA$"E{HOME}"SPC(30)"
       {4}{OFF}RTV";
KS 150 PRINT"XZ"ZC$"SUWY+"ZC$"
       {2 LEFT}{-}-↑{*}
       {SHIFT-SPACE}{K}{I}{T}
       {@}{DOWN}"ZC$"{2 LEFT}
       {£}£{DOWN}{G}{+}{M}
       {5 DOWN}":PRINTSPC(22)"
       {F}{C}{X}{V}{2 DOWN}";
KQ 160 PRINT"{DOWN}{4 LEFT}{E}
       {R}{U}{H}{J}{2 DOWN}"ZC
       $"{L}{Y}{U}{O}{E}"ZB$"
       {7 DOWN}"ZD$;:FORT=1TO6
       :FORI=1TO7
XS 170 PRINTCO$(INT(RND(0)*6)+
       1)AT$;:NEXTI:PRINT:PRIN
       TZD$"{DOWN}";:NEXTT
GE 180 REM START
EQ 190 POKE53247,0:SYS49323:PO
       KES+24,15
BC 200 PRINTZB$"{6 DOWN}"SPC(2
       8)"{WHT}"ZF$"{2 DOWN}"Z
       C$"{LEFT}"ZF$"{2 DOWN}"
       ZC$"{LEFT}"ZF$:GOSUB280
GJ 210 PRINTZB$"{3 DOWN}"ZD$"
       {CYN}F1-{WHT}GAMEPLAY:"
       :PRINTZD$ZE$ZE$;"{UP}"
RF 220 PRINTZD$SPC(7-LEN(DI$(D
       I))/2)DI$(DI):IFDI=1THE
       NDS=0
MS 230 PRINTZD$"{CYN} PRESS RE
       TURN":PRINTZD$"
       {3 SPACES}TO START"
XE 240 IFA$=""THENGOSUB960:GOT
       O240
EG 250 IFA$="{F1}"THENDI=DI+1:
       IFDI=5THENDI=1
CB 260 IFA$=CHR$(13)THEN310
GC 270 A$="":DS=2*DI-3:GOTO210
EE 280 REM PRINT SCORE
FP 290 PRINTZB$"{2 DOWN}":JJ=H
       S:GOSUB300:JJ=SC*DS:GOS
       UB300:JJ=AT:GOSUB300:RE
       TURN
HB 300 PRINT"{2 DOWN}{WHT}"SPC
       (35-LEN(STR$(JJ)))MID$(
       STR$(JJ),2,10):RETURN
FG 310 REM CLEAR AREA
KA 320 PRINTZB$"{3 DOWN}";:FOR
       T=1TO16:PRINTZD$"{OFF}"
       ZE$ZE$:NEXTT
FS 330 REM NEW ATOM
XD 340 PRINTZB$"{2 DOWN}"ZG$:C
       O=C:D$="N"
QH 350 FORT=22TO18STEP-1:PRINT
       ZB$SPC(T)CO$(CO)AT$;:IF
       T=19THENPRINT"G{DOWN}
       {LEFT}G":GOTO370
MK 360 PRINT" {DOWN}{LEFT} ":G
       OSUB960:V=0:R=7:TM=10:R
       E=0
HP 370 GOSUB960:NEXTT:C=INT(RN
       D(0)*6)+1:PRINTZB$SPC(2
       3)CO$(C)"PQ{DOWN}
       {2 LEFT}{2 SPACES}":GOS
       UB960
MP 380 PRINTZB$SPC(23)CO$(C);A
       T$:GOSUB960
AM 390 REM INPUT FROM JOYSTICK
KX 400 JV=PEEK(56320):FR=JVAND
       16:JV=15-(JVAND15):A=R:
       V=0:B=V
KD 410 IFJV=4THENR=R-1:IFR=0TH
       ENR=1
HK 420 IFJV=4THEN460
HR 430 IFJV=8THENR=R+1:IFR=8TH
       ENR=7
DR 440 IFJV=8THEN460
QR 450 IFFR<>16THEN490
PH 460 IFA<>RTHENGOSUB1090
AG 470 TM=TM-1:IFTM=0THEN490
PX 480 GOSUB1120:GOSUB960:GOTO
       400
GX 490 REM DROP ATOM
ER 500 PRINTZB$"{2 DOWN}
       {5 SPACES}{4}A"ZE$ZE$
HS 510 A=R:B=V:V=V+1:IFAG(R,V)
       <>0ORV=9THENV=V-1:GOTO5
       40
SK 520 GOSUB1090:GOSUB1120:GOS
       UB960
KE 530 GOTO510
XK 540 AG(R,V)=CO:IFV=0THEN101
       0
AE 550 REM REACTION
BA 560 F$="N":FORT=1TO8:FORI=1
       TO7:IFAG(I,T)=0ORAG(I,T
       )=10THEN610
HB 570 IFAG(I,T+1)=0ANDT<8THEN
       AG(I,T+1)=AG(I,T):AG(I,
       T)=0:F$="1":GOSUB630:GO
       TO610
QR 580 IFAG(I,T+1)=AG(I,T)ANDT
       <8THENA=I:B=T+1:F$="2":
       GOSUB890
PG 590 IFAG(I-1,T)=AG(I,T)ANDI
       >1THENA=I-1:B=T:F$="2":
       GOSUB890
QK 600 IFF$="2"THENA=I:B=T:F$=
       "1":GOSUB890:F$="1"
BG 610 NEXTI:NEXTT:IFF$="N"THE
       N660
QQ 620 GOTO550
FJ 630 REM PULL ATOM DOWN
HF 640 PRINTZB$"{DOWN}"SPC(I*2
       +4);:FORJ=1TOT:PRINT"
       {2 DOWN}";:NEXTJ:PRINTB
       A$:PRINTZB$"{DOWN}";
GJ 650 PRINTSPC(I*2+4);:FORJ=1
       TOT+1:PRINT"{2 DOWN}";:
       NEXTJ:PRINTCO$(AG(I,T+1
       ))AT$:RETURN
JJ 660 REM DIFFICULTY CHECK
QH 670 IFDI=2ANDD$="N"THEN750
BB 680 IFDI=3ANDD$="N"THEN750
QA 690 IFDI>2THEN710
BS 700 GOTO330
FR 710 REM DRAW BLOCK
HD 720 I=INT(RND(0)*7)+1:T=INT
       (RND(0)*7)+2:AG(I,T)=10
       :PRINTZB$"{DOWN}"SPC(4+
       I*2);
RB 730 FORZ=1TOT:PRINT"
       {2 DOWN}";:NEXTZ:PRINTB
       L$
CM 740 FORZ=10TO1STEP-.5:POKES
       +4,32:POKES+1,Z:POKES,1
       0:POKES+4,33:NEXTZ:GOTO
       330
FA 750 REM DRAW ZAPPER
SJ 760 A=INT(RND(0)*8)+1:IFA=2
       THEN760
FD 770 IFDI=2THENA=INT(RND(0)*
       5)+4
DE 780 PRINTZB$"{DOWN}"SPC(6);
       :FORT=1TOA:PRINT"
       {2 DOWN}";:NEXTT:FORT=1
       TO7:PRINT"{6}{S}{P}";
HG 790 FORZ=1TO100STEP50:POKES
       +4,33:POKES+1,Z:POKES,1
       0:POKES+4,32:NEXTZ
RF 800 IFAG(T,A)<>0THENAG(T,A)
       =INT(RND(0)*6)+1
DX 810 NEXTT:D$="Y":GOSUB820:G
       OTO550
KP 820 REM REDRAW AREA
BD 830 PRINTZB$"{3 DOWN}"SPC(6
       );:FORT=1TO8:FORI=1TO7
JR 840 IFAG(I,T)=0THENPRINTBA$
       ;:GOTO870
GJ 850 IFAG(I,T)=10THENPRINTBL
       $;:GOTO870
DH 860 PRINTCO$(AG(I,T))AT$;
XS 870 NEXTI:PRINT:PRINTSPC(6)
       "{DOWN}";:NEXTT:RETURN
RQ 880 POKES+4,128:POKES+1,10:
       POKES,10:POKES+4,129
XB 890 IFA=I AND B=T AND AG(I,
       T+1)=AG(I,T)THENRETURN
QF 900 IFA=I AND B=T AND AG(I+
       1,T)=AG(I,T)THENRETURN
JM 910 REM DRAW EXPLOSION
MB 920 PRINTZB$"{DOWN}";:FORZ=
       1TOB:PRINT"{2 DOWN}";:N
       EXTZ:PRINTSPC(4+A*2)XP$
```

```
DG 930 FORZ=10TO20:POKES+4,33:
       POKES+1,Z:POKES,10:POKE
       S+4,32:NEXTZ
QK 940 PRINTZB$"{DOWN}";:FORZ=
       1TOB:PRINT"{2 DOWN}";:N
       EXTZ:PRINTSPC(4+A*2)BA$
EQ 950 AG(A,B)=0:RE=RE+1:AT=AT
       +1:SC=SC+RE:GOSUB280:RE
       TURN
JD 960 GETB$:IFB$=CHR$(147)THE
       N1140
FS 970 IFB$<>"<"THENA$=B$:RETU
       RN
SP 980 PRINT"{HOME}{WHT}{OFF}"
       SPC(10)"PAUSED"
FF 990 GETB$:IFB$<>""THENPRINT
       "{HOME}{WHT}{OFF}"SPC(1
       0)ZE$:RETURN
BA 1000 GOTO990
RB 1010 REM NUCLEAR MELTDOWN
SG 1020 PRINTZB$"{3 DOWN}"SPC(
        6);:FORT=1TO8:FORI=1TO
        7:PRINTXP$"{UP}";
FC 1030 POKES+4,129:POKES+1,T*
        10+I*10:POKES,50:POKES
        +4,128
JG 1040 NEXTI:PRINT:PRINTSPC(6
        )"{DOWN}";:NEXTT
XS 1050 FORT=1TO50:POKE53281,0
        :POKE53281,1
KF 1060 POKES+4,129:POKES+1,T:
        POKES,50:POKES+4,128:N
        EXTT:POKE53281,0:POKES
        +24,0
MC 1070 FORT=1TO1000:NEXTT:IFS
        C*DS>HSTHENHS=SC*DS
HE 1080 GOTO1140
MJ 1090 REM REDRAW ATOM
AC 1100 PRINT"{HOME}{4 DOWN}":
        IFB=0THENPRINTSPC(4+A*
        2)BA$:RETURN
GX 1110 PRINT"{DOWN}";:FORT=1T
        OB:PRINT"{2 DOWN}";:NE
        XTT:PRINTSPC(4+A*2)BA$
        :RETURN
DK 1120 PRINT"{HOME}{4 DOWN}":
        IFV=0THENPRINTSPC(4+R*
        2)CO$(CO)AT$:RETURN
KA 1130 PRINT"{DOWN}";:FORT=1T
        OV:PRINT"{2 DOWN}";:NE
        XTT:PRINTSPC(4+R*2)CO$
        (CO)AT$:RETURN
CQ 1140 REM RESET
BG 1150 POKE36866,HS/256:POKE3
        6867,HS-INT(HS/256)*25
        6:POKES+24,0:CLR
AG 1160 HS=PEEK(36866)*256+PEE
        K(36867):S=54272:GOTO2
        0
```

CHAIN.ML

```
C000:A0 E0 B9 20 83 99 90 81 68
C008:C8 F0 03 4C 02 C0 60 A0 C3
C010:E0 B9 40 83 99 90 81 C8 8B
C018:F0 03 4C 11 C0 60 A0 E0 17
C020:B9 60 83 99 90 81 C8 F0 AD
C028:03 4C 20 C0 60 A0 E0 B9 4F
C030:80 83 99 90 81 C8 F0 03 23
C038:4C 2F C0 60 AE FF CF A9 88
C040:20 8D 04 D4 BD C8 C0 8D 23
C048:01 D4 BD 08 C1 4C A2 C0 FC
C050:02 21 8D 04 D4 60 20 3C B1
C058:C0 E8 E0 40 D0 02 A2 00 68
C060:8E FF CF AE FE CF 18 CA 40
C068:F0 0F CA F0 13 CA F0 17 4B
C070:20 0F C0 A2 01 8E FE CF 18
C078:60 20 00 C0 EE FE CF 60 B1
C080:20 0F C0 EE FE CF 60 20 F4
C088:1E C0 EE FE CF 60 18 CE 16
C090:FD CF F0 01 4C 31 EA A9 D9
C098:0A 8D FD CF 20 56 C0 4C 67
C0A0:31 EA 8D 00 D4 A9 21 8D 44
C0A8:04 D4 60 58 A9 8E 8D 14 A9
C0B0:03 58 A9 C0 8D 15 03 58 2A
C0B8:A9 00 8D FF CF A9 01 8D 75
C0C0:FE CF A9 05 8D FD CF 60 9F
C0C8:19 1C 19 19 19 1C 20 19 25
C0D0:1C 13 13 13 15 18 19 18 0C
C0D8:19 1C 19 19 19 1C 20 19 35
C0E0:1C 13 13 13 15 18 19 00 04
C0E8:1C 1C 20 19 1C 1C 20 19 BF
C0F0:1C 13 13 13 15 18 19 00 14
C0F8:1C 1C 20 19 1C 1C 20 19 CF
C100:1C 13 13 13 15 18 19 00 25
C108:B1 D6 B1 B1 B1 D6 5E B1 C2
C110:D6 3F 3F 3F 9A 3F B1 3F 1F
C118:B1 D6 B1 B1 B1 D6 5E B1 D2
C120:D6 3F 3F 3F 9A 3F B1 00 EF
C128:D6 D6 5E B1 D6 D6 5E B1 34
C130:D6 3F 3F 3F 9A 3F B1 00 FF
C138:D6 D6 5E B1 D6 D6 5E B1 44
C140:D6 3F 3F 3F 9A 3F B1 00 10
C148:0D 0D 0D 0D 0D 0D 0D 0D CB
C150:0D 0D 0D 0D 0D 0D 0D 0D D3
C158:0D 0D 0D 0D 0D 0D 0D 0D DB
C160:0D 0D 0D 0D 0D 0D 0D 0D E3
C168:0D 0D 0D 0D 0D 0D 0D 0D EB
C170:0D 0D 0D 0D 0D 0D 0D 0D F3
C178:0D 0D 0D 0D 0D 0D 0D 0D FB
C180:0D 0D 0D 0D 0D 0D 0D 0D 04
C188:0D 0D 0D 0D 0D 0D 0D 0D 0C
C190:0D 0D 0D 0D 0D 0D 0D 0D 14
C198:0D 0D 0D 0D 0D 0D 0D 0D 1C
C1A0:0D 0D 0D 0D 0D 0D 0D 0D 24
C1A8:0D 0D 0D 0D 0D 0D 0D 0D 2C
C1B0:0D 0D 0D 0D 0D 0D 0D 0D 34
C1B8:0D 0D 0D 0D 0D 0D 0D 0D 3C
C1C0:0D 0D 0D 0D 0D 0D 0D 0D 44
C1C8:0D 0D 0D 0D 0D 0D 0D 0D 4C
C1D0:0D 0D 0D 0D 0D 0D 0D 0D 54
C1D8:0D 0D 0D 0D 0D 0D 0D 0D 5C
C1E0:0D 0D 0D 0D 0D 0D 0D 0D 64
C1E8:0D 0D 0D 0D 0D 0D 0D 0D 6C
C1F0:0D 0D 0D 0D 0D 0D 0D 0D 74
C1F8:0D 0D 00 00 00 00 00 00 46
```

CHAIN.CHARS

```
8200:00 55 FF AA AA FF 55 00 05
8208:AA BD BD BD 3D BD BD BD 83
8210:BD BD BD BD BD BD BD BD 15
8218:AA FF FF FF FF FF FF 55 C7
8220:BE BF BF BF BF BF BF 95 7A
8228:BD FD FD FD FD FD FD 55 64
8230:00 00 00 14 69 56 41 40 DD
8238:40 40 40 40 40 40 40 40 3D
8240:D0 D0 D0 D0 D0 D0 D0 D0 45
8248:05 1F 1E 1E 7B 7B 7B 7B 79
8250:55 FF AF FF FF FF FF FF F5
8258:00 40 40 40 D0 D0 D0 D0 B5
8260:7B 7B 7B 7B 7F BF 7F 15 38
8268:FF FF FF FF FF FF FF 55 C2
8270:00 00 00 00 01 07 1F 3F 17
8278:00 00 00 00 40 D0 F4 FC A9
8280:73 F3 FF FF FF FF 7F 1F 5A
8288:CD CF FF FF FF FF FD F4 59
8290:55 68 D0 80 80 80 80 80 04
8298:80 80 80 80 80 D0 68 55 83
82A0:55 C3 82 82 82 82 AA 82 AF
82A8:82 82 82 82 82 82 C3 55 03
82B0:55 0F 1A 35 20 20 2A 20 B0
82B8:20 20 20 20 20 20 30 55 13
82C0:55 0C 48 C8 88 88 88 88 09
82C8:88 88 88 88 88 88 CC 55 23
82D0:55 C3 82 92 92 B2 B6 B6 6E
82D8:9E 9E 8E 86 86 82 C3 55 2A
82E0:3D 33 33 7F 7D C7 C3 41 83
82E8:07 0D 0C 1F 1C 34 3F 15 6D
82F0:C7 0D 0C 1F 1C 34 34 10 BA
82F8:41 C3 C7 C7 CD CD C7 41 7B
8300:F3 40 00 01 01 03 C3 41 FD
8308:FC D0 D0 C1 C1 43 0F 05 36
8310:FD 77 D3 C7 CD 4C C7 41 5B
8318:F0 5C 0C 1D 35 33 D3 41 61
8320:73 73 F7 DF DD 4D 0C 04 FA
8328:00 54 C0 80 B8 CC 54 00 06
8330:00 40 C0 80 80 C0 54 00 17
8338:00 54 C0 A0 80 C0 40 00 FD
8340:0C 1C 3D 73 D3 FD 00 00 C9
8348:00 00 33 73 37 1D 4C F4 A8
8350:15 7A 7B 6F 6F 6F 6F 6F 6E
8358:54 AD FD FD FD FD FD FD 76
8360:6F 6F 7F 6F 7F 7F 7F 15 EF
8368:FD FD FD FD FD FD FD 54 C5
8370:1C 78 1D 37 22 91 D0 40 F3
8378:00 00 00 19 F7 63 11 00 80
8380:40 D0 90 C0 50 B0 D0 40 21
8388:00 00 1F 34 3C 1C F4 00 F2
8390:00 00 3C 70 D1 C3 F3 00 AB
8398:00 00 74 DC DD 77 D3 00 70
83A0:00 00 F4 DC DD 73 33 00 37
83A8:00 00 FC D0 F0 40 F0 00 C6
83B0:00 00 3C 7C FC CC CC 00 BB
83B8:00 00 FC 70 71 D3 C3 00 C8
83C0:00 00 74 DC DD 77 D3 00 98
83C8:00 00 CC DC FC 4C 0F 00 6E
83D0:00 00 7C D0 F0 70 D0 00 5F
83D8:00 00 33 33 7D CC CC 00 32
83E0:00 00 3D 1C 34 30 F4 00 9D
83E8:00 00 3C 70 D0 CC F4 00 22
83F0:00 00 33 33 7D CC CC 00 4A
83F8:00 00 00 00 00 00 00 00 FF
8400:00 00 00 01 03 07 0C 1C 81
8408:00 00 50 F4 FD FD FF CF 22
8410:1F 3F 3F 1F 1F 0F 07 01 96
8418:CF FF FF FF FF FF FD F4 F9
8420:00 00 00 00 01 07 1F 3F CA
8428:00 00 00 00 40 D0 F4 FC 5D
8430:73 F3 FF FF FF FF 7F 1F 0E
8438:CD CF FF FF FF FF FD F4 0D
8440:00 00 05 1F 7F 7F FF F3 C9
8448:00 00 00 40 C0 D0 30 34 33
8450:F3 FF FF FF FF FF 7F 1F 71
8458:F4 FC FC F4 F4 F0 D0 40 57
8460:00 00 00 00 00 01 01 7A E9
8468:40 C0 C0 80 80 80 90 90 99
8470:06 06 02 02 02 03 03 01 81
8478:AD 40 40 00 00 00 00 00 70
8480:0D 0D 0D 0D 0D 0D 0D 0D 89
```

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8488:0D 0D 0D 0D 0D 0D 0D 0D 91
8490:0D 0D 0D 0D 0D 0D 0D 0D 99
8498:0D 0D 0D 0D 0D 0D 0D 0D A1
84A0:0D 0D 0D 0D 0D 0D 0D 0D A9
84A8:0D 0D 0D 0D 0D 0D 0D 0D B1
84B0:0D 0D 0D 0D 0D 0D 0D 0D B9
84B8:0D 0D 0D 0D 0D 0D 0D 0D C1
84C0:0D 0D 0D 0D 0D 0D 0D 0D C9
84C8:0D 0D 0D 0D 0D 0D 0D 0D D1
84D0:0D 0D 0D 0D 0D 0D 0D 0D D9
84D8:0D 0D 0D 0D 0D 0D 0D 0D E1
84E0:0D 0D 0D 0D 0D 0D 0D 0D E9
84E8:0D 0D 0D 0D 0D 0D 0D 0D F1
84F0:0D 0D 0D 0D 0D 0D 0D 0D F9
```

Graham Fyffe, 15, has been programming in BASIC for eight years. He enjoys comics and graphics and likes drawing and painting. He lives in Fredericton, New Brunswick, Canada.

CUSTOM CHARACTER SCREEN DESIGNER

By Daniel English

Advanced programmers commonly work with custom characters on the 64. With a tool such as Ultrafont + (July 1984 and September 1986 issues and on The 1992 Best of Gazette Utilities Disk), you can easily transform characters into your own custom graphics. Using these graphics in your own programs was not so easy—until now. Custom Character Screen Designer allows you to create multiple character screens easily and save them on disk for use in your own programs. A BASIC display program is included in the package. You may want to keep CCSD on a disk with Ultrafont +.

Getting Started

The CCSD package consists of three programs. The main program is the screen editor. When MLX prompts, respond with the following addresses.

Starting address: C000
Ending address: CDFF

Be sure to save a copy of the program before exiting MLX.

The next two programs are used for displaying your screens from within your own BASIC programs. The main CCSD program does not require these two display files, however.

To help avoid typing errors, enter Display.BASIC with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. Remember to save the program before you attempt to run it.

Enter DISPLAY.ML with MLX, our machine language entry program. Again, see "Typing Aids." When MLX prompts, respond with the following addresses.

Starting address: CF00
Ending address: CF77

Be sure to save these two display programs on the same disk for later use.

Functions

To begin, load CCSD with the ,8,1 extension and type *NEW* and then *SYS 49152.* A menu screen will appear. The upper portion of the screen is the menu of commands, and the lower portion displays your character set. You may use the default ROM character set if you do not want to create your own. To load a character set, press F. The character set will always load into 12288 ($3000 hex). If you wish to save your character set at this location for use in your own programs, press N.

When a character set is loaded, you are ready to choose colors. If your character set was created in multicolor mode, press M. Pressing keys 1 through 4 will change the four colors. These keys correspond to the same color keys used in Ultrafont +. If your character set is not in multicolor mode, only keys 1 and 4 will apply.

The current color you are changing will be indicated by the arrow below the color palette. Notice that when you're in multicolor mode, color 4 must be set on the right side of the palette. If you want color memory stored with your screen data, press C.

Next, you must choose an address for your screen. The default address is 32768. To change this, press A. You will be prompted to enter a new address. You can have up to 24 screens in memory (12 with color) at one time. Remember that each screen uses 1000 bytes (2000 if color is saved). If you stored one screen at 32768, then the next one could start at 33768 (35768 if color is saved).

Copying Characters

The lower section of the screen contains your character set. A flashing rectangle encloses the character(s) you have selected to use while drawing your screen. Position the cursor with your joystick in port 2, and use the cursor keys to change the size of the cursor into a window that can copy up to six characters at a time. Press the button to choose the character(s) you wish to copy onto your screen. Press f7 to switch between the editor and drawing screen.

In the drawing screen, the window will appear in the upper left corner of the screen. Use the cursor keys or joystick to move the window. Press the fire button to copy the characters onto the screen. CCSD lets you type data onto the screen also.

All colors and screen functions are available to you while you're in the editor. For example, pressing Shift-Clr/Home will clear the screen, and Ctrl-2 will turn the character color to white. Notice the window doesn't advance automatically when you type. The cursor keys are the easiest way to move the window if you wish to type in text.

A copy feature is built into the drawing screen mode. To copy characters already on the screen, simply move the window over the character(s) you wish to copy and press f1. Now when you draw with the joystick, the copied character(s) will appear. This eliminates frequent screen swapping.

To store the screen and return to the Editor menu, press f7. If you do not want to store the changes, press f8. Pressing f8 can be used as an undo feature.

Screens on Disk

When your screen design is complete, press S from the Editor menu to save it. You'll be asked for a filename, and your screen will be saved to disk.

If you want to load a previously saved screen, press L. A screen is always loaded into the address specified at the top of the screen, regardless of its saved address.

When your character set and screen(s) have been saved to disk, you are ready to use them in your own program. The BASIC display program was designed to be a subroutine. First, have your BASIC program load the DISPLAY.ML file, your saved screen(s), and your saved character set. Next, alter the values in the BASIC display program to match those chosen in CCSD. Remember to change the value of AD in line 63050 to the address of the screen you wish to display.

Machine language programmers will have no problem using CCSD screens. You may use the code in the DISPLAY.ML file or use your own screen copier routine.

CCSD can create many commercial quality effects quickly and efficiently. From a BASIC menu to a complex game background, CCSD will make the task enjoyable.

CCSD

```
C000:4C 84 C1 FF 00 00 81 00 04
C008:00 81 00 00 81 00 00 81 77
C010:00 00 81 00 00 81 00 00 C7
C018:FF 00 00 00 00 00 00 00 99
C020:00 00 00 00 00 00 00 00 A1
C028:00 00 00 00 00 00 00 00 A9
C030:00 00 00 00 00 00 00 00 B1
C038:00 00 00 00 00 00 00 00 B9
C040:00 00 84 FF FF 00 80 01 54
C048:00 80 01 00 80 01 00 80 92
C050:01 00 80 01 00 80 01 00 76
C058:FF FF 00 00 00 00 00 00 D9
C060:00 00 00 00 00 00 00 00 E1
C068:00 00 00 00 00 00 00 00 E9
C070:00 00 00 00 00 00 00 00 F1
C078:00 00 00 00 00 00 00 00 F9
C080:00 00 84 FF FF FF 80 00 93
C088:01 80 00 01 80 00 01 80 41
C090:00 01 80 00 01 80 00 01 6D
C098:FF FF FF 00 00 00 00 00 1A
C0A0:00 00 00 00 00 00 00 00 22
C0A8:00 00 00 00 00 00 00 00 2A
C0B0:00 00 00 00 00 00 00 00 32
C0B8:00 00 00 00 00 00 00 00 3A
C0C0:00 00 84 FF 00 00 81 00 D5
C0C8:00 81 00 00 81 00 00 81 38
C0D0:00 00 81 00 00 81 00 00 88
C0D8:81 00 00 81 00 00 81 00 36
C0E0:00 81 00 00 81 00 00 81 50
C0E8:00 00 81 00 00 81 00 00 A0
C0F0:FF 00 00 00 00 00 00 00 72
C0F8:00 00 00 00 00 00 00 00 7A
C100:00 00 84 FF FF 00 80 01 16
C108:00 80 01 00 80 01 00 80 54
C110:01 00 80 01 00 80 01 00 38
C118:80 01 00 80 01 00 80 01 2E
C120:00 80 01 00 80 01 00 80 6C
C128:01 00 80 01 00 80 01 00 50
C130:FF FF 00 00 00 00 00 00 B3
C138:00 00 00 00 00 00 00 00 BB
C140:00 00 84 FF FF FF 80 00 55
C148:01 80 00 01 80 00 01 80 03
C150:00 01 80 00 01 80 00 01 2F
C158:80 00 01 80 00 01 80 00 49
C160:01 80 00 01 80 00 01 80 1B
C168:00 01 80 00 01 80 00 01 47
C170:FF FF FF 00 00 00 00 00 F3
C178:00 00 00 00 00 00 00 00 FB
C180:00 00 84 FF 4C 19 CA 2A 1B
C188:2A 2A 2A 2A 2A 2A 2A 2A 0C
C190:2A 2A 2A 2A 2A 2A 2A 00 E9
C198:A9 01 8D 19 D0 AD 18 D0 B2
C1A0:C9 15 F0 1A A9 AC 8D 12 3B
C1A8:D0 A9 15 8D 18 D0 A9 C8 9A
C1B0:8D 16 D0 A9 0B 8D 20 D0 D4
C1B8:8D 21 D0 4C E3 C1 A9 0A AD
C1C0:8D 12 D0 A9 1D 8D 18 D0 64
C1C8:AD 64 C6 8D 20 D0 8D 21 6E
C1D0:D0 AD 65 C6 8D 22 D0 AD 85
C1D8:66 C6 8D 23 D0 AD 67 C6 F7
C1E0:8D 16 D0 AD 0D DC 29 01 D4
C1E8:F0 03 4C 31 EA 4C BC FE 43
C1F0:78 A9 1B 8D 11 D0 A9 F1 68
C1F8:8D 1A D0 A9 98 8D 14 03 A4
C200:A9 C1 8D 15 03 A9 7F 8D 19
C208:0D DC 58 60 A9 00 8D 1A DE
C210:D0 A9 31 8D 14 03 A9 EA 52
C218:8D 15 03 A9 81 8D 0D DC DD
C220:58 A9 15 8D 18 D0 A9 C8 D7
C228:8D 16 D0 A9 0B 8D 20 D0 4E
C230:A9 00 8D 21 D0 60 A0 04 9B
C238:A2 00 86 FA 84 FB AE 59 5A
C240:C6 AC 5A C6 86 FC 84 FD 3B
C248:20 A3 C2 AD 68 C6 C9 01 EC
C250:F0 01 60 A0 D8 A2 00 86 7C
C258:FA 84 FB AE 5B C6 AC 5C 92
C260:C6 86 FC 84 FD 4C A3 C2 FD
C268:A9 36 85 01 A0 04 A2 00 6B
C270:86 FC 84 FD AE 59 C6 AC FD
C278:5A C6 86 FA 84 FB 20 A3 55
C280:C2 AD 68 C6 C9 01 F0 01 81
C288:60 A0 D8 A2 00 86 FC 84 44
C290:FD AE 5B C6 AC 5C C6 86 83
C298:FA 84 FB 20 A3 C2 A9 37 F0
C2A0:85 01 60 A9 00 85 FE 85 69
C2A8:FF A0 00 B1 FA 91 FC A5 2F
C2B0:FC 18 69 01 85 FC A5 FD 61
C2B8:69 00 85 FD A5 FA 18 69 36
C2C0:01 85 FA A5 FB 69 00 85 EC
C2C8:FB A5 FE 18 69 01 85 FE 70
C2D0:A5 FF 69 00 85 FF A5 FF CD
C2D8:C9 03 D0 CF A5 FE C9 E8 C0
C2E0:D0 C9 60 8D FF CF A2 00 AA
C2E8:CA D0 FD CE FF CF D0 F8 8E
C2F0:60 00 00 A9 00 8D F1 C2 1E
C2F8:8D F2 C2 20 51 C3 20 E4 1B
C300:FF C9 00 F0 F6 C9 14 F0 01
C308:2B C9 0D F0 59 C9 1F B0 29
C310:03 4C FB C2 C9 5B 90 03 B7
C318:4C FB C2 AE F1 C2 E0 10 74
C320:90 03 4C FB C2 AC F1 C2 69
C328:99 87 C1 20 D2 FF EE F1 FE
C330:C2 4C FB C2 AD F1 C2 C9 5C
C338:00 D0 03 4C FB C2 A9 20 77
C340:AC F1 C2 99 0A 04 CE F1 7C
C348:C2 A9 14 20 D2 FF 4C FB 4B
C350:C2 A9 12 20 D2 FF A9 20 F1
C358:20 D2 FF A9 92 20 D2 FF F9
C360:A9 9D 20 D2 FF 60 AD F1 24
C368:C2 C9 00 F0 10 AD F1 C2 B0
C370:8D 97 C1 A9 20 20 D2 FF 9E
C378:A9 0D 4C D2 FF A9 01 8D 05
C380:F2 C2 A9 20 20 D2 FF A9 5F
C388:0D 4C D2 FF 93 11 92 9F A9
C390:20 20 20 20 43 55 53 54 A0
C398:4F 4D 20 43 48 41 52 2E 6D
C3A0:20 53 43 52 45 45 4E 20 96
C3A8:44 45 53 49 47 4E 45 52 F2
C3B0:20 56 31 2E 30 0D 1F 20 FA
C3B8:20 20 20 A3 A3 A3 A3 A3 2D
C3C0:A3 20 A3 A3 A3 A3 20 20 DC
C3C8:A3 A3 A3 A3 A3 A3 20 A3 49
C3D0:A3 A3 A3 A3 A3 A3 A3 0D C1
C3D8:9E 20 20 20 20 20 43 55 1B
C3E0:52 52 45 4E 54 20 41 44 9D
C3E8:44 52 45 53 53 3A 20 05 CD
C3F0:33 32 37 36 38 20 20 98 04
C3F8:43 4F 4C 4F 52 3A 4F 46 D4
C400:46 0D 11 20 20 20 05 53 F2
C408:1E 20 53 41 56 45 20 53 82
C410:43 52 45 45 4E 20 20 20 20
C418:05 4C 1E 20 4C 4F 41 44 63
C420:20 53 43 52 45 45 4E 0D 05
C428:20 20 20 05 46 1E 20 4C 55
C430:4F 41 44 20 43 48 41 52 4C
C438:53 45 54 20 20 05 4E 1E 19
C440:20 53 41 56 45 20 43 48 B5
C448:41 52 53 45 54 20 24 33 64
C450:30 30 30 0D 20 20 20 05 9B
C458:31 2D 34 1E 20 43 48 41 0E
C460:4E 47 45 20 43 4F 4C 4F CC
C468:52 53 20 28 05 34 1E 3D E8
C470:44 52 41 57 43 4F 4C 4F 8D
C478:52 29 0D 00 20 20 20 05 DD
C480:41 1E 20 43 48 41 4E 47 95
C488:45 20 41 44 44 52 20 20 F4
C490:20 05 43 1E 20 43 4F 4C AE
C498:4F 52 20 44 41 54 41 20 A4
C4A0:4F 46 46 2F 4F 4E 0D 20 0D
C4A8:20 20 05 46 37 2F 46 38 8A
C4B0:1E 20 53 57 41 50 2F 55 30
C4B8:4E 44 4F 20 05 51 1E 20 30
C4C0:51 55 49 54 0D 20 20 20 FF
C4C8:05 4D 1E 20 4D 55 4C 54 9A
C4D0:49 43 4F 4C 4F 52 20 20 A2
C4D8:20 20 20 12 90 20 05 20 CE
C4E0:1C 20 9F 20 9C 20 1E 20 38
C4E8:1F 20 9E 20 92 20 90 28 3E
C4F0:4D 2F 43 20 44 52 41 57 9C
C4F8:29 0D 20 20 20 20 20 20 42
C500:20 20 20 20 20 20 12 90 DF
C508:20 05 20 1C 20 9F 20 9C 07
C510:20 1E 20 1F 20 9E 20 81 66
C518:20 95 20 96 20 97 20 98 BE
C520:20 99 20 9A 20 9B 20 92 12
C528:0D 11 20 20 20 20 99 55 8E
C530:53 45 20 4A 4F 59 53 54 3A
C538:49 43 4B 20 54 4F 20 43 08
C540:48 4F 4F 53 45 20 43 48 5C
C548:41 52 41 43 54 45 52 53 15
C550:0D 20 20 20 05 28 43 55 15
C558:52 53 4F 52 20 4B 45 59 03
C560:53 20 43 48 41 4E 47 45 A1
C568:20 53 49 5A 45 20 4F 46 37
C570:20 57 49 4E 44 4F 57 29 27
C578:0D 00 93 11 11 9F 56 41 03
C580:4C 49 44 20 53 43 52 45 A0
C588:45 4E 20 41 44 44 52 45 7F
C590:53 53 3A 20 31 36 33 38 E4
C598:34 2D 34 37 31 35 30 0D 4F
C5A0:11 9A 45 4E 54 45 52 20 65
C5A8:41 44 44 52 45 53 53 3A EB
C5B0:20 05 00 93 11 11 9F 43 16
C5B8:48 41 52 53 45 54 20 46 3A
C5C0:49 4C 45 4E 41 4D 45 3A 95
C5C8:20 05 00 93 11 11 9F 53 3E
C5D0:43 52 45 45 4E 20 46 49 58
C5D8:4C 45 4E 41 4D 45 3A 20 CD
C5E0:05 00 A2 00 A0 00 8A 99 F6
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C5E8:84 06 C8 E8 C0 20 D0 F6 FE
C5F0:A0 00 8A 99 AC 06 C8 E8 AF
C5F8:C0 20 D0 F6 A0 00 8A 99 2A
C600:D4 06 C8 E8 C0 20 D0 F6 40
C608:A0 00 8A 99 FC 06 C8 E8 4B
C610:C0 20 D0 F6 A0 00 8A 99 43
C618:24 07 C8 E8 C0 20 D0 F6 40
C620:A0 00 8A 99 4C 07 C8 E8 E1
C628:C0 20 D0 F6 A0 00 8A 99 5B
C630:74 07 C8 E8 C0 20 D0 F6 80
C638:A0 00 8A 99 9C 07 C8 E8 7C
C640:C0 20 D0 F6 AD 63 C6 A0 E8
C648:00 99 84 DA 99 E8 DA C8 69
C650:C0 FF D0 F5 60 00 00 00 BA
C658:00 00 80 E8 83 00 00 00 A0
C660:00 00 00 0D 00 01 02 C8 8F
C668:00 00 AD 00 DC 29 0F C9 1F
C670:0E F0 0D C9 0D F0 2B C9 CB
C678:0B F0 65 C9 07 F0 45 60 F7
C680:AD 56 C6 C9 00 D0 01 60 95
C688:CE 56 C6 AD 01 D0 38 E9 6C
C690:08 8D 01 D0 A5 A3 38 E9 C8
C698:28 85 A3 A5 A4 E9 00 85 BC
C6A0:A4 60 AD 56 C6 C9 07 D0 EF
C6A8:01 60 EE 56 C6 AD 01 D0 D1
C6B0:18 69 08 8D 01 D0 A5 A3 B8
C6B8:18 69 28 85 A3 A5 A4 69 70
C6C0:00 85 A4 60 AD 55 C6 C9 64
C6C8:1F D0 01 60 EE 55 C6 20 BA
C6D0:FC C6 A5 A3 18 69 01 85 6B
C6D8:A3 A5 A4 69 00 85 A4 60 8C
C6E0:AD 55 C6 C9 00 D0 01 60 B5
C6E8:CE 55 C6 20 11 C7 A5 A3 A4
C6F0:38 E9 01 85 A3 A5 A4 E9 74
C6F8:00 85 A4 60 AD 00 D0 18 A9
C700:69 08 8D 00 D0 AD 00 D0 06
C708:C9 08 90 01 60 EE 10 D0 50
C710:60 AD 00 D0 38 E9 08 8D 4F
C718:00 D0 AD 00 D0 C9 F7 B0 DF
C720:01 60 EE 10 D0 60 A5 C5 40
C728:C9 07 F0 05 C9 02 F0 10 15
C730:60 A9 32 20 E3 C2 AD 8D B5
C738:02 C9 01 F0 56 4C 71 C7 F8
C740:A9 32 20 E3 C2 AD 8D 02 5D
C748:C9 01 F0 14 4C 4F C7 AD 39
C750:F8 07 C9 FC D0 01 60 C9 3C
C758:FF D0 01 60 EE F8 07 60 0C
C760:AD F8 07 C9 FA D0 01 60 FF
C768:C9 FD D0 01 60 CE F8 07 BD
C770:60 AD F8 07 C9 FA F0 09 50
C778:C9 FB F0 0B C9 FC F0 0D EB
C780:60 A9 FD 8D F8 07 60 A9 91
C788:FE 8D F8 07 60 A9 FF 8D C1
C790:F8 07 60 AD F8 07 C9 FD BA
C798:F0 09 C9 FE F0 0B C9 FF 53
C7A0:F0 0D 60 A9 FA 8D F8 07 99
C7A8:60 A9 FB 8D F8 07 60 A9 79
C7B0:FC 8D F8 07 60 AD 00 DC 48
C7B8:29 0F C9 0E F0 0D C9 0D 17
C7C0:F0 2B C9 0B F0 74 C9 07 71
C7C8:F0 54 60 AD 56 C6 C9 00 2E
C7D0:D0 01 60 CE 56 C6 AD 01 2C
C7D8:D0 38 E9 08 8D 01 D0 A5 54
C7E0:A3 38 E9 28 85 A3 A5 A4 BA
C7E8:E9 00 85 A4 60 AD 56 C6 95
C7F0:C9 17 90 10 AD F8 07 C9 67
C7F8:FD 90 01 60 AD 56 C6 C9 EF
C800:18 90 01 60 EE 56 C6 AD F3
C808:01 D0 18 69 08 8D 01 D0 31
C810:A5 A3 18 69 28 85 A3 A5 3B
C818:A4 69 00 85 A4 60 AD 55 06
C820:C6 C9 27 D0 01 60 EE 55 36
C828:C6 20 FC C6 A5 A3 18 69 86
C830:01 85 A3 A5 A4 69 00 85 C2
C838:A4 60 AD 55 C6 C9 00 D0 6D
C840:01 60 CE 55 C6 20 11 C7 3A
C848:A5 A3 38 E9 01 85 A3 A5 46
C850:A4 E9 00 85 A4 60 AD F8 02
C858:07 C9 FA F0 15 C9 FB F0 07
C860:1B C9 FC F0 24 C9 FD F0 D5
C868:2D C9 FE F0 36 C9 FF F0 BB
C870:42 60 A0 00 AD 5D C6 91 51
C878:A3 4C C3 C8 A0 01 AD 5E B6
C880:C6 91 A3 20 C3 C8 4C 72 9C
C888:C8 A0 02 AD 5F C6 91 A3 9E
C890:20 C3 C8 4C 7C C8 A0 28 71
C898:AD 60 C6 91 A3 20 C3 C8 F8
C8A0:4C 72 C8 A0 29 AD 61 C6 A1
C8A8:91 A3 20 C3 C8 20 96 C8 E8
C8B0:4C 7C C8 A0 2A AD 62 C6 3E
C8B8:91 A3 20 C3 C8 20 A3 C8 13
C8C0:4C 89 C8 A5 A4 18 69 D4 7B
C8C8:85 A4 AD 86 02 91 A3 A5 A7
C8D0:A4 38 E9 D4 85 A4 60 20 EC
C8D8:E4 FF C9 00 D0 01 60 8D EE
C8E0:FF CF C9 11 F0 1F C9 1D 65
C8E8:F0 21 C9 91 F0 14 C9 9D 96
C8F0:F0 16 AE 56 C6 AC 55 C6 16
C8F8:18 20 F0 FF AD FF CF 4C 16
C900:D2 FF 4C CB C7 4C ED C7 56
C908:4C 3A C8 4C 1E C8 A0 00 83
C910:B1 A3 8D 5D C6 A0 01 B1 59
C918:A3 8D 5E C6 A0 02 B1 A3 2D
C920:8D 5F C6 A0 28 B1 A3 8D 12
C928:60 C6 A0 29 B1 A3 8D 61 DC
C930:C6 A0 2A B1 A3 8D 62 C6 8E
C938:60 AD 69 C6 C9 01 D0 01 F5
C940:60 A9 01 8D 69 C6 AD 0E 37
C948:DC 29 FE 8D 0E DC A5 01 7D
C950:29 FB 85 01 A0 D0 A2 00 C5
C958:86 FA 84 FB A0 30 A2 00 49
C960:86 FC 84 FD A0 00 B1 FA 4A
C968:91 FC A5 FA 18 69 01 85 56
C970:FA A5 FB 69 00 85 FB A5 B4
C978:FC 18 69 01 85 FC A5 FD 37
C980:69 00 85 FD A5 FD C9 38 4A
C988:D0 DA A5 01 09 04 85 01 64
C990:AD 0E DC 09 01 8D 0E DC E1
C998:A9 FA 8D F8 07 A0 00 B9 75
C9A0:03 C0 99 80 3E B9 C3 C0 42
C9A8:99 40 3F C8 C0 C0 D0 EF 28
C9B0:60 A9 93 20 D2 FF 20 F0 1B
C9B8:C1 A9 00 8D 15 D0 A9 08 B7
C9C0:20 D2 FF A9 1D 8D 18 D0 D3
C9C8:A0 00 B9 8C C3 C9 00 F0 E2
C9D0:07 20 D2 FF C8 4C CA C9 21
C9D8:A0 00 B9 7C C4 C9 00 F0 F9
C9E0:07 20 D2 FF C8 4C DA C9 51
C9E8:20 E2 C5 A9 01 8D 15 D0 D1
C9F0:8D 27 D0 A9 00 8D 10 D0 F0
C9F8:A9 38 8D 00 D0 A9 B2 8D 41
CA00:01 D0 AD 63 C6 20 CB CB 50
CA08:A9 00 8D 55 C6 8D 56 C6 59
CA10:A9 06 85 A4 A9 84 85 A3 05
CA18:60 20 39 C9 20 B1 C9 A9 AE
CA20:32 20 E3 C2 EE 27 D0 20 55
CA28:6A C6 20 26 C7 20 DF CA 54
CA30:20 E3 CB AD 00 DC 29 10 F8
CA38:C9 00 F0 0F A5 C5 C9 3E D7
CA40:D0 DD 20 0C C2 A9 64 20 20
CA48:E3 C2 00 20 0C C2 AD 67 B0
CA50:C6 8D 16 D0 A9 1D 8D 18 71
CA58:D0 AD 64 C6 8D 21 D0 20 6D
CA60:0E C9 A9 04 85 A4 A9 00 F6
CA68:85 A3 A9 00 8D 55 C6 8D BB
CA70:56 C6 A9 00 8D 10 D0 A9 10
CA78:18 8D 00 D0 A9 32 8D 01 BC
CA80:D0 AD 63 C6 8D 86 02 A9 F6
CA88:93 20 D2 FF 20 68 C2 A9 1C
CA90:C8 20 E3 C2 A9 00 85 C6 5A
CA98:A9 28 20 E3 C2 20 B5 C7 19
CAA0:EE 27 D0 20 D7 C8 A5 C5 86
CAA8:C9 03 F0 18 C9 04 F0 24 E7
CAB0:AD 00 DC 29 10 C9 00 D0 C3
CAB8:DF F0 03 4C 98 CA 20 56 26
CAC0:C8 4C 98 CA AD 8D 02 C9 FE
CAC8:01 F0 03 20 36 C2 20 B1 2C
CAD0:C9 4C 1F CA 20 0E C9 A9 65
CAD8:63 20 E3 C2 4C 98 CA A5 D0
CAE0:C5 C9 38 F0 48 C9 3B F0 B2
CAE8:5E C9 08 F0 74 C9 0B F0 02
CAF0:21 C9 24 F0 2C C9 14 F0 BE
CAF8:2B C9 0A F0 1B C9 03 F0 DD
CB00:1A C9 15 F0 19 C9 0D F0 C3
CB08:1E C9 2A F0 1D C9 27 F0 C4
CB10:04 60 4C 7B CB 4C 4E CD FC
CB18:4C 03 CC 4C 4B CA 4C 6C 7F
CB20:CC 4C 9B CB 4C B4 CB 4C 7A
CB28:E9 CC 4C AB CC A9 63 20 20
CB30:E3 C2 EE 64 C6 AD 64 C6 0B
CB38:C9 10 F0 03 4C CB CB A9 D9
CB40:00 8D 64 C6 4C CB CB A9 07
CB48:63 20 E3 C2 EE 65 C6 AD 8A
CB50:65 C6 C9 10 F0 03 4C CB 7E
CB58:CB A9 00 8D 65 C6 4C CB C3
CB60:CB A9 63 20 E3 C2 EE 66 25
CB68:C6 AD 66 C6 C9 10 F0 03 7B
CB70:4C CB CB A9 00 8D 66 C6 FE
CB78:4C CB CB A9 63 20 E3 C2 63
CB80:EE 63 C6 AD 63 C6 C9 10 F5
CB88:F0 06 20 CB CB 4C E2 C5 F5
CB90:A9 00 8D 63 C6 20 CB CB FE
CB98:4C E2 C5 AD 67 C6 C9 D8 65
CBA0:F0 08 A9 D8 8D 67 C6 4C 59
CBA8:AF CB A9 C8 8D 67 C6 A9 0E
CBB0:63 4C E3 C2 AD 68 C6 C9 1C
CBB8:01 F0 08 A9 01 8D 68 C6 7E
CBC0:4C AF CB A9 00 8D 68 C6 4C
CBC8:4C AF CB AA A9 20 A0 00 A5
CBD0:99 E0 05 C8 C0 27 D0 F8 D7
CBD8:A9 1E 9D EC 05 A9 01 9D BD
CBE0:EC D9 60 AD 68 C6 C9 00 3E
CBE8:F0 0B A9 0E 8D 9C 04 A9 62
CBF0:20 8D 9D 04 60 A9 0F 8D 45
CBF8:9B 04 A9 06 8D 9C 04 8D 69
CC00:9D 04 60 20 0C C2 A0 00 24
CC08:B9 7A C5 C8 20 D2 FF C9 78
CC10:00 D0 F5 A9 00 85 C6 8D 68
CC18:15 D0 A9 64 20 E3 C2 20 22
CC20:60 A5 86 7A 84 7B 20 73 91
CC28:00 B0 3B 20 6B A9 A6 14 BA
CC30:A4 15 8E 59 C6 8C 5A C6 AC
CC38:A5 15 18 69 03 85 15 A5 81
CC40:14 18 69 E8 85 14 A5 15 82
CC48:69 00 85 15 A6 14 A4 15 7C
CC50:8E 5B C6 8C 5C C6 A0 00 E8
CC58:A2 64 B9 AF 04 9D 8C C3 02
CC60:C8 E8 C0 05 D0 F4 20 B1 4D
CC68:C9 4C 1F CA 20 0C C2 A0 E1
CC70:00 B9 B3 C5 C8 20 D2 FF B7
```

```
CC78:C9 00 D0 F5 A9 00 85 C6 8F
CC80:8D 15 D0 A9 64 20 E3 C2 09
CC88:20 F3 C2 AD F1 C2 C9 00 90
CC90:F0 13 AD F1 C2 8D AD CD B1
CC98:A0 30 A2 00 8E AB CD 8C 2E
CCA0:AC CD 20 AE CD 20 B1 C9 0F
CCA8:4C 1F CA 20 0C C2 A0 00 38
CCB0:B9 CB C5 C8 20 D2 FF C9 75
CCB8:00 D0 F5 A9 00 85 C6 8D 11
CCC0:15 D0 A9 64 20 E3 C2 20 CA
CCC8:F3 C2 AD F1 C2 C9 00 F0 10
CCD0:12 8D AD CD AC 5A C6 AE 74
CCD8:59 C6 8E AB CD 8C AC CD 25
CCE0:20 AE CD 20 B1 C9 4C 1F 5E
CCE8:CA 20 0C C2 A0 00 B9 CB E1
CCF0:C5 C8 20 D2 FF C9 00 D0 C8
CCF8:F5 A9 00 85 C6 8D 15 D0 B7
CD00:A9 64 20 E3 C2 20 F3 C2 0D
CD08:AD F1 C2 C9 00 F0 39 AD CF
CD10:F1 C2 8D AD CD AC 5C C6 82
CD18:AE 5B C6 8E AB CD 8C AC FD
CD20:CD AD 68 C6 C9 01 F0 03 BE
CD28:4C 45 CD AD AC CD 18 69 06
CD30:03 8D AC CD AD AB CD 18 F2
CD38:69 E8 8D AB CD AD AC CD 7B
CD40:69 00 8D AC CD 20 CE CD 67
CD48:20 B1 C9 4C 1F CA 20 0C CE
CD50:C2 A0 00 B9 B3 C5 C8 20 77
CD58:D2 FF C9 00 D0 F5 A9 00 48
CD60:85 C6 8D 15 D0 A9 64 20 89
CD68:E3 C2 20 F3 C2 AD F1 C2 5D
CD70:C9 00 F0 31 AD F1 C2 8D 6A
CD78:AD CD A0 37 A2 FF 8E AB C3
CD80:CD 8C AC CD AD 59 C6 85 7E
CD88:FE AD 5A C6 85 FF A9 00 46
CD90:8D 59 C6 A9 30 8D 5A C6 EF
CD98:20 CE CD A5 FE 8D 59 C6 B3
CDA0:A5 FF 8D 5A C6 20 B1 C9 4A
CDA8:4C 1F CA 00 30 00 AD AD 16
CDB0:CD A2 87 A0 C1 20 BD FF E0
CDB8:A9 00 A2 08 A0 01 20 BA 02
CDC0:FF AE AB CD AC AC CD A9 B7
CDC8:00 85 B9 4C D5 FF A9 36 F9
CDD0:85 01 AD AD CD A2 87 A0 A8
CDD8:C1 20 BD FF A9 00 A2 08 AF
CDE0:A0 01 20 BA FF AE 59 C6 F0
CDE8:AC 5A C6 86 FA 84 FB AE 43
CDF0:AB CD AC AC CD A9 FA 20 61
CDF8:D8 FF A9 37 85 01 60 37 D1
```

DISPLAY.BASIC

```
SR 63000 REM **** CCSD SCREEN
         {SPACE}DISPLAY ****
QD 63010 REM * DISPLAY ML & SC
         REENS MUST *
DA 63020 REM * CHARSET @ 12288
          MUST ALL{2 SPACES}*
DE 63030 REM *{6 SPACES}BE IN
         {SPACE}MEMORY!
         {8 SPACES}*
RP 63040 REM *****************
         *************
EK 63050 AD=32768:REM *SCREEN
         {SPACE}ADDRESS
CF 63060 C=0:REM *1 FOR COLOR
         {SPACE}SCREENS
HE 63070 POKE53272,29:REM *21=
         ROM CHARSET
AD 63080 POKE53270,216:REM *20
         0=NON-MCOLOR
XP 63090 POKE53281,0:REM *BACK
         GROUND
SC 63100 POKE53282,1:REM *COLO
         R 2
HK 63110 POKE53283,2:REM *COLO
         R 3
KJ 63120 POKE646,13:REM *COLOR
         4
PD 63130 PRINT CHR$(147)
GJ 63140 H=INT(AD/256):L=AD-25
         6*H:POKE53104,C:POKE5
         3105,L:POKE53106,H
PQ 63150 SYS 52992:REM *DISPLA
         Y SCREEN
AM 63160 RETURN
```

DISPLAY.ML

```
CF00:A9 36 85 01 A0 04 A2 00 1D
CF08:86 FC 84 FD AE 71 CF AC 22
CF10:72 CF 86 FA 84 FB 20 30 E1
CF18:CF AD 70 CF C9 01 D0 0B 15
CF20:A0 D8 A2 00 86 FC 84 FD C9
CF28:20 30 CF A9 37 85 01 60 AA
CF30:A9 00 85 FE 85 FF A0 00 B2
CF38:B1 FA 91 FC A5 FC 18 69 2C
CF40:01 85 FC A5 FD 69 00 85 D6
CF48:FD A5 FA 18 69 01 85 FA 86
CF50:A5 FB 69 00 85 FB A5 FE 55
CF58:18 69 01 85 FE A5 FF 69 CE
CF60:00 85 FF A5 FF C9 03 D0 B9
CF68:CF A5 FE C9 E8 D0 C9 60 54
CF70:00 00 80 E8 83 00 00 00 CA
```

Daniel English says he got bored using FOR-NEXT loops to save character screens, so he wrote this utility. He lives in Moreno Valley, California.

RIGHT/SIDE II

By Edward A. Gase

Right/Side II is an enhanced version of the original Right/Side program written by Robert B. Cook and published in the November 1990 issue of COMPUTE. It lets you print documents down fanfold paper rather than printing across it.

This version works with Epson-compatible printers in either single- or double-density modes with your interface in transparent mode. More significantly, you can now use a variety of screen character sets as custom fonts for printing. You'll even be able to see what the character set looks like onscreen.

Right/Side II is ideal for those times when you need to print something wider than 80 columns on an 80-column printer and you don't want to switch to condensed type. It's also terrific for making keyboard overlays.

Although Right/Side II was originally written with SpeedScript in mind, it works well with any word processor that handles PETSCII sequential files. SpeedScript, EasyScript, and The Write Stuff are particularly well suited for use with Right/Side II because they allow you to include the graphics characters accessible with the Commodore logo key.

Right/Side II consists of two programs, one in BASIC and one in machine language. To help avoid typing errors, enter the BASIC program with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. When you've finished, be sure to save a copy to disk. The second program is written in machine language. To enter it, you'll need to use MLX, COMPUTE's machine language entry program; see "Typing Aids" again. When MLX prompts, enter the following values.

Starting address: C000
Ending address: C4E7

When you've finished typing, be sure to save a copy of the program with the filename RIGHT/SIDE.ML before you leave MLX. When you're ready to use Right/Side II, simply load and run the BASIC portion. It will automatically load the machine language file.

Printing Sideways

When creating a sequential file for Right/Side II, remember that the right margin of the text will be printed at what's normally the top of the paper. Set your right margin for any width up to 255 characters and your left margin to 0. If you are using EasyScript, specify the column width at the startup screen. If you have chosen a length that is longer than your longest line, spaces will be added to the top of the page.

Right/Side would print 80 lines per page according to the original article. With my system, I can get only about 60 lines with 9–10 characters per inch. That would produce a maximum length of 25.5–28.3 inches. The results you get will depend on your printer/interface combination and whether you choose Epson or Commodore mode. The Epson printouts will be longer, but there will be more separation between characters.

Your original file must be a PETSCII

sequential file. Some word processors can save in that format. If you're using SpeedScript, the easiest way to create such a file is to press Shift-Ctrl-P and then press D to print your document to disk as a sequential file. Then you're ready to run Right/Side II. If you produce a file that is too long, Right/Side II will print the excess over the top of the text on the left side of the paper. If the printout looks strange, reduce the length of your file.

Menu Options

When you run Right/Side II and the menu appears, press f1 to select Create Right/Side File. This option converts the sequential file into a Right/Side II file. Enter the name of your sequential file and then the name of the file you'll be creating. The letters *R/S* are added automatically as a prefix to indicate to the program that this is a Right/Side II document. Press Return on a blank line to return to the main menu.

To print your file sideways, simply press f3 and then enter the name of the newly created Right/Side II file. You don't have to include the R/S prefix; it's added automatically. Next, choose between Commodore or Epson. If you choose Epson, you'll be given the choice of printing in single or double density. Then press any key to start printing. To stop printing, press and hold the space bar.

Press f2 to load a custom character set that you may wish to use. You'll be asked the name of the character set. The onscreen display will change to reflect the new characters. If you don't like what you see on the screen, you can change the character set before you print your file.

Any nine-block character set, such as those created with Ultrafont+, should work just fine. I have also used three-block character sets successfully. Normally, you will use Right/Side II with uppercase and lowercase characters, including the graphics characters accessed with the Commodore logo key. You could, of course, use an uppercase/graphics set. As there are dozens of character sets that have been created for the Commodore 64, you should be able to get just the look you want for your printouts.

RIGHT/SIDE II

```
XA 100 REM COPYRIGHT 1993 COMP
       UTE PUBLICATIONS, INTL.
       , LTD. - ALL RIGHTS RES
       ERVED
BC 110 GOSUB1310:REM INITIALIZ
       E
HD 120 GOSUB990:REM MAIN SCREE
       N
RG 130 POKE198,0:WAIT198,1:GET
       G$:G=ASC(G$)-132:IFG<1O
       RG>5THEN130
EK 140 ONGGOSUB180,400,700,150
       ,1180:GOTO120
GD 150 POKE53280,14:POKE53281,
       6:POKE53272,(PEEK(53272
       )AND240)OR4
BS 160 PRINT"{7}{CLR}":END
MS 170 REM{2 SPACES}CREATE FIL
       E
PB 180 PS=1:GOSUB1000:PS=0
JQ 190 PRINTTAB(7)"{2 DOWN}
       {RVS}{RED}'############
       ############%"
FM 200 PRINTTAB(7)"{RVS}'{OFF}
        {GRN}CREATE {RVS}{BLK}
       R{OFF}IGHT/{RVS}S{OFF}I
       DE {GRN}FILE {RVS}{RED}
       {BLK} "
PH 210 PRINTTAB(7)"{RVS}{RED}'
       $$$$$$$$$$$$$$$$$$$$$$$
       ${BLK} "
JS 220 PRINTTAB(9)"{RVS}{BLK}
       {24 SPACES}"
XC 230 POKE214,10:PRINT"{DOWN}
       {2 SPACES}{RVS}{BLU}F
       {OFF}ILE TO BE READ?
       {GRN}"BF$;
RG 240 LN=16:GOSUB760:F1$=IN$:
       IFF1$=""THENRETURN
EJ 250 DE=63:GOSUB830:IFEN<>63
       THEN230
XS 260 DE=0:GOSUB840:IFEN>19TH
       EN230
GR 270 POKE214,13:PRINT"{DOWN}
       {2 SPACES}{RVS}{BLU}F
       {OFF}ILE TO BE CREATED?
        {GRN}R/S."MID$(BF$,5,2
       4);
DP 280 LN=12:GOSUB760:IN$="R/S
       ."+IN$:F2$=IN$:IFF2$="R
       /S."THENRETURN
CJ 290 DE=62:GOSUB830:IFF2$=F1
       $THEN270
QX 300 IFDE=ENTHEN340
SH 310 PRINT"{UP}{2 SPACES}
       {RVS}{RED}O{OFF}VERWRIT
       E FILE? [{GRN}Y/N{RED}]
       {GRN} ";:IN=1:GOSUB760
HG 320 IFIN$<>"Y"THENPRINT"
       {UP}"BL$:GOTO270
AG 330 OPEN15,8,15,"S0:"+F2$:C
       LOSE15
HC 340 POKE214,19:PRINTTAB(7)"
       {DOWN}{PUR}{5 Q} CREATI
       NG{2 SPACES}FILE {5 Q}
       {HOME}"
RS 350 SA=49152:FORL=1TO2
JQ 360 OPEN8,8,8,F1$+",S,R":SY
       S SA:SA=49194:CLOSE8:NE
       XT:REM READ & CONVERT
DP 370 OPEN8,8,8,F2$+",S,W":SY
       S49285:CLOSE8:REM WRITE
        TO DISK
HS 380 RETURN
HH 390 REM PRINT FILE
ER 400 PS=1:GOSUB1000:PS=0:NP=
       0
SE 410 PRINTTAB(7)"{2 DOWN}
       {RVS}{RED}'############
       ############%"
DG 420 PRINTTAB(7)"{RVS}'{OFF}
        {GRN}PRINT {RVS}{BLK}R
       {OFF}IGHT/{RVS}S{OFF}ID
       E {GRN}FILE {RVS}{RED}
       {BLK} "
KF 430 PRINTTAB(7)"{RVS}{RED}'
       $$$$$$$$$$$$$$$$$$$$$$$
       {BLK} "
QJ 440 PRINTTAB(9)"{RVS}{BLK}
       {23 SPACES}"
MB 450 POKE214,10:PRINT"{DOWN}
       {2 SPACES}{RVS}{BLU}F
       {OFF}ILE TO BE PRINTED?
        {GRN}R/S."MID$(BF$,5,2
       4);
BF 460 LN=12:GOSUB760:IN$="R/S
       ."+IN$:F1$=IN$:IFF1$="R
       /S."THENRETURN
FS 470 DE=63:GOSUB830:IFEN<>63
       THEN450
GK 480 DE=0:GOSUB840:IFEN>19TH
       EN450
QD 490 POKE214,13:PRINT"{DOWN}
       {2 SPACES}{RVS}{BLU}E
       {OFF}PSON OR {RVS}C
       {OFF}OMMODORE ? [{GRN}E
       /C{BLU}]{GRN} ";
QX 500 IN=1:LN=1:GOSUB760:MO$=
       IN$:POKE49499,1
MH 510 IFIN$=""THENRETURN
KH 520 IFMO$="E"THENPRINT"
       {DOWN}{2 SPACES}{RVS}
       {BLU}N{OFF}ORMAL OR
       {RVS}H{OFF}I {RVS}D
       {OFF}ENSITY ? [{GRN}N/H
       {BLU}]{GRN} ";
EF 530 IFMO$="E"THENGOSUB760:D
       E$=IN$:IFDE$="H"THENPOK
       E49499,2
SB 540 IFIN$=""THENRETURN
QB 550 OPEN15,4,15:CLOSE15:ON-
       (ST=0)GOTO590:IFNP=1THE
       NRETURN
AB 560 OPEN15,4,15:CLOSE15:ON-
       (ST=0)GOTO590:IFNP=1THE
       NRETURN
MC 570 POKE214,16:PRINT"{DOWN}
       {2 SPACES}{RVS}{RED}C
       {OFF}ONNECT PRINTER THE
       N PRESS A KEY":GOSUB960
       :NP=1
AP 580 POKE198,0:WAIT198,1:GET
       Q$:GOTO550
```

```
BK 590 POKE214,17:PRINT"{DOWN}
       {2 SPACES}{RVS}{PUR}P
       {OFF}RESS ANY KEY TO BE
       GIN PRINTING ":GOSUB930
QG 600 POKE198,0:WAIT198,1
BB 610 POKE214,19:PRINT"{DOWN}
       {PUR}{2 SPACES}{5 Q} PR
       ESS {RVS}{RED}SPACE
       {RIGHT}BAR{OFF} {PUR}TO
        ABORT {5 Q}{HOME}"
DS 620 OPEN4,4,7+((MO$="E")*3)
AX 630 IFMO$="E"THENPRINT#4,CH
       R$(27)CHR$(64)CHR$(27)C
       HR$(65)CHR$(8):GOTO650
AK 640 PRINT#4,CHR$(8):REM GRA
       PHICS MODE
XG 650 OPEN 8,8,8,F1$+",S,R":I
       FMO$="C"THENSYS49356:CL
       OSE8:CLOSE4:GOTO670
JQ 660 SYS49501:CLOSE8:OPEN4,4
       ,7: PRINT#4,CHR$(27)CHR
       $(64):CLOSE4:RETURN
XC 670 OPEN 4,4,7:PRINT#4,CHR$
       (15):CLOSE 4
JA 680 RETURN
SP 690 REM DIRECTORY
RS 700 PRINT"{CLR}{RVS}{GRN}D
       {OFF}IRECTORY{BLU}"
PA 710 SYS57812"$",8:POKE43,1:
       POKE44,48:POKE768,174:P
       OKE769,167:SYS47003,1
PK 720 POKE782,48:SYS65493:SYS
       42291:LIST:POKE44,8:POK
       E768,139:POKE769,227
GP 730 PRINT:PRINT" {RVS}{GRN}
        PRESS ANY KEY TO RETUR
       N {HOME}"
CM 740 POKE198,0:WAIT198,1:RET
       URN
RM 750 REM INPUT
FX 760 CP=0:IN$="":GOSUB930
QM 770 POKE204,0:POKE198,0:WAI
       T198,1:GETQ$
DK 780 IFQ$=CHR$(20)ANDCP>0THE
       NCP=CP-1:IN$=LEFT$(IN$,
       CP):PRINTQ$;
CC 790 IFQ$=>" "ANDQ$<="Z"ANDC
       P<LNTHENCP=CP+1:IN$=IN$
       +Q$:PRINTQ$;
JK 800 POKE212,0:IFQ$<>CHR$(13
       )THEN770
GB 810 POKE204,1:PRINT"{OFF} "
       :RETURN
KP 820 REM DISK CHECK
BS 830 OPEN15,8,15,"R0:"+IN$+"
       ="+IN$:CLOSE15:GOTO850
AD 840 OPEN8,8,8,IN$+",S,R":CL
       OSE8
EM 850 OPEN15,8,15:INPUT#15,EN
       ,EM$:CLOSE15
HM 860 IFDE=ENOREN<20THENRETUR
       N
BR 870 PRINT"{2 DOWN}
       {2 SPACES}{RVS}{1}D
       {OFF}ISK ERROR: {BLK}"E
       N;EM$:GOSUB960:POKE198,
       0
FF 880 FORL=0TO1500:GETQ$:IFQ$
       =""THENNEXT
PF 890 PRINT"{UP}"BL$
HX 900 RETURN
EM 910 REM SOUNDS
QR 920 REM BING
KJ 930 POKEAT,10:POKESR,73:POK
       EWV,17:POKEHF,50:POKELL
       ,0
HG 940 FORI=1TO333:NEXT:POKEWV
       ,16:RETURN
JG 950 REM BUZZ
QM 960 POKEHF,5:POKEAT,0:POKES
       R,240:POKEWV,33
GD 970 FORI=1TO500:NEXT:POKEWV
       ,32:RETURN
GB 980 REM SCREEN
KD 990 POKE53280,3:POKE53281,1
       :POKE53272,(PEEK(53272)
       AND240)OR10
BA 1000 PRINT"{CYN}{CLR}{I}{T}
        {I}{T}{I}{T}{I}{T}{I}
        {T}{I}{T}{I}{T}{I}{T}
        {I}{T}{I}{T}{I}{T}{I}
        {T}{I}{T}{I}{T}{I}{T}
        {I}{T}{I}{T}{I}{T}{I}
        {T}{I}{T}";
PS 1010 PRINT"{8}-------------
        ----------------------
        -----"
CR 1020 POKE214,22:PRINT"
        {DOWN}{8}{40 @}";
DF 1030 PRINT"{CYN}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{K}
        {SHIFT-SPACE}{HOME}":P
        OKE2023,97
EG 1040 IFPSTHENRETURN
JD 1050 PRINTTAB(5)"{BLK}ABCDE
        {2 SPACES}{3}{M}
        {14 £}£ {OFF} {RVS}
        {BLK}ABCDE"
EA 1060 PRINTTAB(5)"FGHIJ
        {2 SPACES}{RED}{G}
        {14 SPACES}{+}{RVS}
        {BLK} {OFF} {RVS}FGHIJ
        "
SA 1070 PRINTTAB(5)"KLMNO
        {2 SPACES}{3}{G}
        {2 SPACES}{RVS}{BLK}R
        {OFF}IGHT/{RVS}S{OFF}I
        DE{2 SPACES}{RED}{+}
        {RVS}{BLK} {OFF} {RVS}
        KLMNO"
MK 1080 PRINTTAB(5)"PQRST
        {2 SPACES}{3}{G}
        {14 SPACES}{RED}{+}
        {RVS}{BLK} {OFF} {RVS}
        PQRST"
QX 1090 PRINTTAB(5)"UVWXY
        {2 SPACES}{RED}{N}
        {14 Q}{D}{RVS}{BLK}
        {OFF} {RVS}UVWXY"
XJ 1100 PRINTTAB(5)"{2 SPACES}
        Z{5 SPACES}{RVS}
        {16 SPACES}{OFF}
        {3 SPACES}{RVS}Z"
FJ 1110 PRINTTAB(7)"{DOWN}
        {BLU}F 1{2 SPACES}
        {RVS}{GRN}C{OFF}REATE
        {SPACE}{RVS}{BLK}R
        {OFF}IGHT/{RVS}S{OFF}I
        DE {GRN}FILE"
JF 1120 PRINTTAB(7)"{2 DOWN}
        {BLU}F 2{2 SPACES}
        {RVS}{GRN}LOAD{OFF}
        {2 SPACES}{RVS}{BLK}C
        {OFF}HARACTER SET{GRN}
        "
SS 1130 PRINTTAB(7)"{2 DOWN}
        {BLU}F 3{2 SPACES}
        {RVS}{GRN}P{OFF}RINT
        {RVS}{BLK}R{OFF}IGHT/
        {RVS}S{OFF}IDE {GRN}FI
        LE"
CD 1140 PRINTTAB(7)"{2 DOWN}
        {BLU}F 5{2 SPACES}
        {RVS}{GRN}D{OFF}ISK DI
        RECTORY"
AX 1150 PRINTTAB(7)"{2 DOWN}
        {BLU}F 7{2 SPACES}
        {RVS}{GRN}Q{OFF}UIT PR
        OGRAM"
GD 1160 FORL=1TO5:POKE214,4+L*
        3:PRINTTAB(6)"{DOWN}
        {5}{Z}{3 S}{P}{5 LEFT}
        {DOWN}{A}{3 RIGHT}{E}
        {5 LEFT}{DOWN}{R}{3 W}
        {H}{HOME}":NEXT
AP 1170 RETURN
ES 1180 PS=1:GOSUB1000:PS=0
DP 1190 PRINTTAB(7)"{2 DOWN}
        {RVS}{RED}'###########
        #############%"
MB 1200 PRINTTAB(7)"{RVS}'
        {OFF} {GRN}LOAD
        {3 SPACES}{RVS}{BLK}C
        {OFF}HARACTER SET{GRN}
        {3 SPACES}{RVS}{RED}
        {BLK} "
BM 1210 PRINTTAB(7)"{RVS}{RED}
        '$$$$$$$$$$$$$$$$$$$$$
        $$${BLK} "
SH 1220 PRINTTAB(9)"{RVS}{BLK}
        {24 SPACES}"
KR 1230 POKE214,10:PRINT"
        {DOWN}{RVS}{BLU}C{OFF}
        HARACTER SET TO LOAD?
        {GRN} "BF$;:LN=16:GOSU
        B760
QX 1240 IFIN$=""THENRETURN
XX 1250 IN$=LEFT$(IN$,16):GOSU
        B850:IFEN>19THEN1230
EH 1260 POKE780,0:POKE781,8:PO
        KE782,0:SYS65466
FE 1270 FORL=1TOLEN(IN$):POKE8
        49+L,ASC(MID$(IN$,L,1)
        ):NEXT
BP 1280 POKE780,LEN(IN$):POKE7
        81,850AND255:POKE782,8
        50/256:SYS65469
AK 1290 POKE780,0:POKE781,0:PO
        KE782,40:SYS65493:SYS4
        9677:RETURN
GB 1300 REM INITIALIZE
KE 1310 IFB=0THENB=1:DIMK(168)
PP 1320 IFPEEK(10240)+PEEK(491
        52)=222THEN1390
HF 1330 IFA=0THENA=1:LOAD"RIGH
        T/SIDE.ML",8,1
BA 1340 PRINT"{CLR}{2 DOWN}SET
        TING UP...."
KM 1350 POKE56334,0:POKE1,51
XX 1360 POKE781,9:POKE782,1:PO
        KE88,0:POKE89,48:POKE9
        0,0:POKE91,224
BR 1370 SYS41964:POKE1,55:POKE
        56334,1
DB 1380 SYS 49677
CJ 1390 LF=54272:HF=54273:WV=5
        4276:AT=54277:SR=54278
        :VL=54296:POKEVL,15
FR 1400 BL$="{38 SPACES}"
BQ 1410 BF$="{16 SPACES}
        {16 LEFT}"
AJ 1420 RETURN
```

RIGHT/SIDE.ML

```
C000:A2 00 A0 00 84 FC A2 08 4C
C008:20 C6 FF 20 B7 FF D0 67 14
C010:C8 20 CF FF C9 0D D0 0A 26
C018:C4 FC 90 02 84 FC A0 00 C6
C020:A2 00 20 E1 FF D0 E4 4C 6E
C028:77 C0 A2 08 20 C6 FF A9 30
C030:00 85 F7 A9 30 85 F8 A2 D8
C038:00 A0 00 84 FD 20 B7 FF 0A
C040:D0 35 E8 20 CF FF C9 0D B5
C048:D0 1A E4 FC F0 09 A9 20 44
C050:20 6F C0 E8 4C 4A C0 A2 14
C058:00 E6 FD A5 FD C9 50 90 F5
C060:DC 4C 77 C0 20 6F C0 20 BE
C068:E1 FF D0 D1 4C 77 C0 91 65
C070:F7 C8 D0 02 E6 F8 60 20 56
C078:CC FF A9 08 20 C3 FF A9 CF
C080:04 20 C3 FF 60 A2 08 20 42
C088:C9 FF 20 B7 FF D0 E8 C6 4A
C090:FC A5 FC 85 FE 18 A9 FF 9D
C098:65 FC 85 F7 A9 2F 69 00 19
C0A0:85 F8 A6 FD A0 00 B1 F7 38
C0A8:20 D2 FF 18 A5 F7 65 FE 47
C0B0:85 F7 A5 F8 69 00 85 F8 86
C0B8:CA D0 EB A9 0D 20 D2 FF 7A
C0C0:C6 FC F0 B3 20 E1 FF D0 97
C0C8:CC 4C 77 C0 A9 00 85 FB 13
C0D0:85 02 A2 08 20 C6 FF 20 A6
C0D8:E4 FF AA 20 B7 FF D0 0E 91
C0E0:8A C9 0D F0 0D A4 FB 99 57
C0E8:00 30 E6 FB D0 E9 A9 02 96
C0F0:85 02 A0 00 88 D0 FD 20 6D
C0F8:CC FF 88 D0 FD A2 04 20 A1
C100:C9 FF A9 00 85 FC A2 08 0B
C108:A4 FC B9 00 30 85 FD A9 91
C110:00 85 F7 A9 28 85 F8 18 EF
C118:A5 F7 65 FD 85 F7 A5 F8 49
C120:69 00 85 F8 CA D0 F0 A0 B4
C128:00 B1 F7 30 03 18 69 80 E5
C130:20 D2 FF C8 C0 08 D0 F1 BE
C138:E6 FC A5 FC C5 FB D0 C6 79
C140:A9 0D 20 D2 FF 20 CC FF 27
C148:A5 02 D0 09 A5 C5 C9 3C DD
C150:F0 03 4C CC C0 4C 77 C0 4A
C158:1B 4B 4C 02 00 A9 00 85 12
C160:FB 85 02 A2 08 20 C6 FF FB
C168:20 E4 FF AA 20 B7 FF D0 90
C170:0E 8A C9 0D F0 0D A4 FB A8
C178:99 00 30 E6 FB D0 E9 A9 DD
C180:02 85 02 A0 00 88 D0 FD 72
C188:20 CC FF 88 D0 FD A2 04 9F
C190:20 C9 FF A9 00 85 FC A2 E3
C198:08 A4 FC B9 00 30 85 FD 4E
C1A0:A9 00 85 F7 A9 28 85 F8 1B
C1A8:18 A5 F7 65 FD 85 F7 A5 92
C1B0:F8 69 00 85 F8 CA D0 F0 E8
C1B8:A0 00 B1 F7 AA BD 3C C2 C9
C1C0:48 AD 58 C1 20 D2 FF AE F5
C1C8:5B C1 BD 58 C1 20 D2 FF DB
C1D0:AD 5B C1 20 D2 FF A9 00 26
C1D8:20 D2 FF 68 AE 5B C1 CA D8
C1E0:F0 03 20 D2 FF 20 D2 FF F4
C1E8:C8 C0 08 D0 CD E6 FC A5 B8
C1F0:FC C5 FB D0 A2 A9 0D 20 E6
C1F8:D2 FF 20 CC FF A5 02 D0 22
C200:09 A5 C5 C9 3C F0 03 4C C0
C208:5D C1 4C 77 C0 A2 00 BD FB
C210:00 2A 9D 00 2E E8 E0 00 AA
C218:D0 F5 BD 00 28 9D 00 2A 1D
C220:E8 E0 00 D0 F5 BD E4 C3 93
C228:9D 00 2D E8 E0 00 D0 F5 4F
C230:BD 3C C3 9D 00 2B E8 E0 55
C238:A7 D0 F5 60 00 80 40 C0 CD
C240:20 A0 60 E0 10 90 50 D0 4C
C248:30 B0 70 F0 08 88 48 C8 EA
C250:28 A8 68 E8 18 98 58 D8 5C
C258:38 B8 78 F8 04 84 44 C4 46
C260:24 A4 64 E4 14 94 54 D4 6C
C268:34 B4 74 F4 0C 8C 4C CC 0B
C270:2C AC 6C EC 1C 9C 5C DC 7C
C278:3C BC 7C FC 02 82 42 C2 0C
C280:22 A2 62 E2 12 92 52 D2 8C
C288:32 B2 72 F2 0A 8A 4A CA 2B
C290:2A AA 6A EA 1A 9A 5A DA 9C
C298:3A BA 7A FA 06 86 46 C6 86
C2A0:26 A6 66 E6 16 96 56 D6 AC
C2A8:36 B6 76 F6 0E 8E 4E CE 4B
C2B0:2E AE 6E EE 1E 9E 5E DE BC
C2B8:3E BE 7E FE 01 81 41 C1 1F
C2C0:21 A1 61 E1 11 91 51 D1 CC
C2C8:31 B1 71 F1 09 89 49 C9 6B
C2D0:29 A9 69 E9 19 99 59 D9 DC
C2D8:39 B9 79 F9 05 85 45 C5 C6
C2E0:25 A5 65 E5 15 95 55 D5 EC
C2E8:35 B5 75 F5 0D 8D 4D CD 8B
C2F0:2D AD 6D ED 1D 9D 5D DD FC
C2F8:3D BD 7D FD 03 83 43 C3 8C
C300:23 A3 63 E3 13 93 53 D3 0E
C308:33 B3 73 F3 0B 8B 4B CB AC
C310:2B AB 6B EB 1B 9B 5B DB 1E
C318:3B BB 7B FB 07 87 47 C7 08
C320:27 A7 67 E7 17 97 57 D7 2E
C328:37 B7 77 F7 0F 8F 4F CF CC
C330:2F AF 6F EF 1F 9F 5F DF 3E
C338:3F BF 7F FF 03 07 07 07 88
C340:03 00 00 00 C0 E0 E0 E0 75
C348:C0 00 00 00 00 00 00 03 33
C350:07 07 07 03 00 00 00 C0 EE
C358:E0 E0 E0 C0 00 00 00 00 B0
C360:7E 00 00 00 AA AA AA AA 27
C368:AA AA AA AA 55 55 55 55 EF
C370:55 55 55 55 FF 80 BF A0 1A
C378:AF A8 AB AA FF 00 FF 00 22
C380:FF 00 FF 00 FF 01 FD 05 0D
C388:F5 15 D5 55 AA AB A8 AF 65
C390:A0 BF 80 FF 00 FF 00 FF 68
C398:00 FF 00 FF 55 D5 15 F5 42
C3A0:05 FD 01 FF 00 00 00 0F 59
C3A8:18 14 13 13 00 00 00 FF D4
C3B0:00 00 FF 00 00 00 00 F0 29
C3B8:18 38 F8 F8 12 12 12 12 18
C3C0:12 12 12 12 78 78 78 78 48
C3C8:78 78 78 78 13 13 17 1F 73
C3D0:0F 00 00 00 00 FF FF FF DF
C3D8:FF 00 00 00 F8 B8 D8 F8 B5
C3E0:F0 00 00 00 FF FF FF FF E0
C3E8:FF FF FF FF F0 F0 F0 F0 8E
C3F0:F0 F0 F0 F0 00 00 00 00 5A
C3F8:FF FF FF FF FF 00 00 00 80
C400:00 00 00 00 00 00 00 00 89
C408:00 00 00 FF C0 C0 C0 C0 DC
C410:C0 C0 C0 C0 CC CC 33 33 81
C418:CC CC 33 33 03 03 03 03 02
C420:03 03 03 03 00 00 00 00 7C
C428:CC CC 33 33 CC 99 33 66 7E
C430:CC 99 33 66 03 03 03 03 80
C438:03 03 03 03 18 18 18 1F 05
C440:1F 18 18 18 00 00 00 00 E3
C448:0F 0F 0F 0F 18 18 18 1F 60
C450:1F 00 00 00 00 00 00 F8 62
C458:F8 18 18 18 00 00 00 00 E8
C460:00 00 FF FF 00 00 00 1F 09
C468:1F 18 18 18 18 18 18 FF 5D
C470:FF 00 00 00 00 00 00 FF F9
C478:FF 18 18 18 18 18 18 F8 D6
C480:F8 18 18 18 C0 C0 C0 C0 5C
C488:C0 C0 C0 C0 E0 E0 E0 E0 F3
C490:E0 E0 E0 E0 07 07 07 07 56
C498:07 07 07 07 FF FF 00 00 B8
C4A0:00 00 00 00 FF FF FF 00 2A
C4A8:00 00 00 00 00 00 00 00 32
C4B0:00 FF FF FF 01 03 06 6C C6
C4B8:78 70 60 00 00 00 00 00 A6
C4C0:F0 F0 F0 F0 0F 0F 0F 0F 0E
C4C8:00 00 00 00 18 18 18 F8 9C
C4D0:F8 00 00 00 F0 F0 F0 F0 F4
C4D8:00 00 00 00 F0 F0 F0 F0 80
C4E0:0F 0F 0F 0F 00 00 C0 FF 0A
```

Edward A. Gase of Fairfield, Ohio, is an earth science teacher and president of the Cincinnati Commodore Computer Club. He is married and has four children between the ages of 4 and 20. He uses R/S II to design keyboard overlays similar to Leroy's Cheatsheets.

JIGSAW 128

By Emil Heyrovsky

Jigsaw 128 is a 50-piece jigsaw puzzle game for the 128 in 40-column mode. With it you can scramble and reassemble any Koala- or Doodle-format picture. Unlike the traditional game, Jigsaw 128 uses nice rectangular pieces.

Typing It In

Jigsaw 128 is written entirely in machine language but loads and runs like a BASIC program. To enter it, use the 128 version of MLX. See "Typing Aids" elsewhere in this section if you need a copy of this program. When MLX prompts, respond with the following values.

Starting address: 1C01
Ending address: 2D08

Be sure to save a copy of the program before exiting MLX.

Playing the Pieces

To start the game, load it using the DLOAD command and type *RUN*. A menu screen will appear, and you'll be asked to insert a disk. This means a disk that contains pictures saved in Doodle or Koala format. (These files have DD or a reverse space and PIC at the beginning of their filenames.) If any pictures are found, a list of their names will be displayed.

You can cycle through the list using the cursor keys. If you want to load another picture disk, press D, and you'll be asked to insert a disk. The Stop key gets you back to the current list. Press Q to quit the program.

Once you've selected the picture you want, press Return to load it. A Doodle graphic will load almost instantly. It takes about 24 seconds, however, to set up a Koala picture. The screen will be blank during this time.

Once the picture loads, you'll have a couple of seconds to look at it, and then the screen will scramble. If you need another look at the unscrambled picture, press the 128's Help key.

The object of Jigsaw 128 is to move rectangular portions of the scrambled picture about the screen to reconstruct the original image. To move your rectangular cursor to the desired piece, use the J, I, K, and L keys to move left, up, down, and right, respectively. To exchange two pieces, mark the first one with the space bar. Move the cursor to the desired location and press the space bar again. If you change your mind about the marked block, cancel your selection by pressing the left-arrow key (the one at the top left corner of your keyboard).

When you think you have all the pieces in their correct location, press C. You'll hear an unpleasant sound if you're wrong or a slightly more pleasant one if your image is correct. If the sound is the better of the two, the cursor frame will disappear. Then, press any key, and you'll have the choice of using the same picture again or trying another.

While playing the game, press Stop to return to the text screen and the picture list. You'll be asked to confirm this choice. All of these commands are listed on the main screen.

A Few Notes

In a multicolor (Koala) picture, two areas may appear identical, but the bytes that represent them may differ. This fact is important if you want to compare the appearance of the active screen with the one in memory. The routine that standardizes the pictures causes the 24-second delay when setting up a Koala picture. With the Doodle or high-resolution files, this routine is much simpler, and the delay is hardly noticeable.

It is sometimes difficult to complete a picture with many intricate or blank areas. It sometimes helps to look for "dust" or single dots in an area. If you get stuck, just press the Stop key at any time and load another graphic.

If you select Q to quit from the text screen, the function key definitions will be restored, but you'll have to load the program to play again.

Finally, I would like to thank my brother Albert for writing the Koala help routine and for his advice.

JIGSAW 128

```
1C01:0F 1C 0A 00 DE 9C 3A 9E 85
1C09:31 30 38 37 30 00 00 00 E1
1C11:A9 20 85 FB A9 1C 85 FD 5D
1C19:A0 00 84 FA 84 FC A0 00 3B
1C21:B1 FC 29 0F 85 FE B1 FC 10
1C29:4A 4A 4A 4A 85 FF B1 FA 91
1C31:C9 FF D0 1E C8 C0 08 D0 74
1C39:F5 A0 00 A5 FF 0A 0A 0A 35
1C41:0A 05 FF 91 FC 98 91 FA 41
1C49:C8 C0 08 D0 F9 38 B0 49 7F
1C51:90 CC A0 00 B1 FA D0 13 47
1C59:C8 C0 08 D0 F7 A8 A5 FE E0
1C61:0A 0A 0A 0A 05 FE 91 FC 47
1C69:38 B0 2E A0 00 A5 FE C5 14
1C71:FF 90 04 F0 1C D0 22 B1 77
1C79:FA 49 FF 91 FA C8 C0 08 1F
1C81:D0 F5 A5 FE 0A 0A 0A 0A DA
1C89:05 FF A0 00 91 FC 38 B0 F9
1C91:08 98 91 FA C8 C0 08 D0 FF
1C99:F9 A5 FA 18 69 08 85 FA 8A
1CA1:90 02 E6 FB E6 FC D0 02 0E
1CA9:E6 FD A5 FD C9 1F 90 A0 F5
1CB1:A5 FC C9 E8 90 9A 60 8D 01
1CB9:B3 08 8D BB 08 A0 00 BD BB
1CC1:68 0B 99 00 D4 E8 C8 BD BD
1CC9:68 0B 99 00 D4 98 18 69 CE
1CD1:06 A8 E8 C0 15 90 E8 60 7D
1CD9:8D 04 D4 8D 0B D4 8D 12 26
1CE1:D4 60 08 A0 00 98 99 00 3D
1CE9:D4 C8 C0 18 D0 F8 A9 0F 25
1CF1:8D 18 D4 28 08 90 05 A9 4A
1CF9:00 8D 15 D0 A9 05 A2 00 EB
1D01:20 A7 08 A9 00 28 08 B0 32
1D09:02 A2 0C 20 A7 08 A9 11 32
1D11:20 C8 08 85 A2 A5 A2 C9 A1
1D19:30 90 FA A9 10 20 C8 08 24
1D21:28 B0 03 4C 8D 1A A5 D4 B5
1D29:C9 58 F0 FA A9 73 85 01 53
1D31:A9 00 85 D8 8D 20 D0 8D 9A
1D39:21 D0 20 0A 19 A0 12 B9 06
1D41:44 0B 99 79 07 88 10 F7 9D
1D49:84 A2 A5 A2 C9 16 D0 FA 90
1D51:20 8A 0B C9 19 F0 03 4C 1B
1D59:2F 1B A9 72 85 01 A0 20 DF
1D61:A5 C4 C9 1C F0 0A A5 C8 5E
1D69:8D 20 D0 8D 21 D0 A0 A0 93
1D71:84 D8 4C 28 1A 49 4E 53 16
1D79:45 52 54 20 44 49 53 4B B0
1D81:13 03 17 26 4E 4F 20 4B 86
1D89:4F 41 4C 41 20 4F 52 20 5C
1D91:44 4F 4F 44 4C 45 20 46 ED
1D99:49 4C 45 53 51 55 49 54 30
1DA1:20 28 59 2F 4E 29 51 55 23
1DA9:49 54 20 54 48 49 53 20 15
1DB1:50 49 43 20 28 59 2F 4E 24
1DB9:29 53 48 55 46 46 4C 45 E4
1DC1:20 41 47 41 49 4E 20 28 45
1DC9:59 2F 4E 29 00 A9 0E 85 21
1DD1:9D 8D 00 FF A9 C0 8D 04 AD
1DD9:0A 4C 16 19 00 28 84 28 52
1DE1:84 28 84 D1 12 31 1C A2 46
1DE9:25 68 09 F7 09 E1 08 01 52
1DF1:03 0E 06 06 0E 03 01 0F DF
1DF9:0C 0B 0B 0C 0F 01 03 A5 47
1E01:D4 C9 58 F0 FA C9 3F F0 A2
1E09:F6 A0 00 84 D0 84 D1 C5 33
1E11:D4 F0 FC 60 00 A2 02 A0 C8
1E19:1E 20 A7 16 A9 FD 8D 30 53
1E21:D0 AD 11 D0 29 EF 8D 11 95
1E29:D0 A2 00 B5 A7 48 E8 E0 E2
1E31:04 D0 F8 20 00 0C A9 A0 E8
1E39:85 D8 A9 FC 8D 30 D0 A2 E4
1E41:03 68 95 A7 CA 10 FA A2 75
1E49:03 A0 28 20 A7 16 60 20 AC
1E51:00 08 A2 02 A0 2D 60 A0 1F
1E59:00 8C 00 FF B9 80 09 99 34
```

```
1E61:00 10 C8 C0 0A D0 F5 A9 EF
1E69:0D 8D 20 D0 A9 0B 8D 21 56
1E71:D0 4C 59 FA 00 A9 20 85 70
1E79:FB A9 D8 85 FF A9 1C 85 F5
1E81:FD A9 00 85 FA 85 FC 85 EC
1E89:FE 85 A6 20 81 0C A5 B0 B5
1E91:0A 0A 0A 0A 05 B1 A0 00 67
1E99:91 FC A5 B2 91 FE B1 FA A4
1EA1:85 AA A9 04 85 AB A9 00 EE
1EA9:06 AA 2A 06 AA 2A AA B5 42
1EB1:A6 05 AA 85 AA C6 AB D0 C8
1EB9:ED A5 AA 91 FA C8 C0 08 49
1EC1:D0 DC A5 FA 18 69 08 85 FD
1EC9:FA 90 02 E6 FB E6 FC D0 9C
1ED1:02 E6 FD E6 FE D0 02 E6 1D
1ED9:FF A5 A1 29 01 AA BD 7C F0
1EE1:0B 8D 20 D0 A5 FD C9 1F EF
1EE9:90 A1 A5 FC C9 E8 90 9B 0A
1EF1:A5 C8 8D 20 D0 60 A2 00 34
1EF9:8A 95 A7 E8 E0 05 D0 F9 1B
1F01:A8 A9 01 85 83 A2 05 B1 D8
1F09:FA 85 B6 CA F0 32 A9 00 4D
1F11:06 B6 2A 06 B6 2A C9 00 97
1F19:F0 F1 C5 AA F0 ED C5 AB 26
1F21:F0 E9 86 B5 AA A5 AA F0 B0
1F29:04 86 AB D0 02 86 AA A5 B2
1F31:83 95 A6 18 69 01 C9 04 D3
1F39:A6 B5 B0 09 85 83 90 CB 06
1F41:C8 C0 08 90 C2 A0 00 B1 68
1F49:FC 48 29 0F 85 B5 68 4A 4C
1F51:4A 4A 4A 85 B4 B1 FE 29 7C
1F59:0F 85 B6 AD 21 D0 29 0F DF
1F61:85 B3 A0 00 A2 02 B5 B4 A0
1F69:C5 B3 D0 02 94 A7 CA 10 9A
1F71:F5 A4 B3 A2 02 B5 A7 D0 7B
1F79:02 94 B4 CA 10 F7 A4 A7 72
1F81:A5 B4 C5 B5 D0 02 84 A8 14
1F89:C5 B6 D0 02 84 A9 A4 A8 4F
1F91:A5 B5 C5 B6 D0 02 84 A9 75
1F99:A2 02 A9 01 D5 A7 D0 18 F5
1FA1:A9 02 AA D5 A7 F0 32 CA 18
1FA9:10 F9 AA A9 03 D5 A7 D0 ED
1FB1:02 D6 A7 CA 10 F7 30 21 2A
1FB9:CA 10 E1 A2 02 B5 A7 C9 C7
1FC1:03 F0 04 C9 02 D0 02 D6 09
1FC9:A7 CA 10 F1 A2 02 A9 01 21
1FD1:D5 A7 B0 05 CA 10 F9 30 06
1FD9:E2 A5 B3 85 B0 85 B1 85 46
1FE1:B2 A0 00 A2 02 B5 A7 A8 AA
1FE9:F0 05 B5 B4 99 AF 00 CA 3A
1FF1:10 F3 60 A9 20 85 FB A9 94
1FF9:1C 85 FD A0 00 84 FA 84 FD
2001:FC A0 00 B1 FC 29 0F 85 33
2009:FE B1 FC 4A 4A 4A 4A 85 0F
2011:FF B1 FA D0 13 C8 C0 08 6F
2019:D0 F7 A8 A5 FE 0A 0A 0A 6D
2021:0A 05 FE 91 FC 38 B0 2E F8
2029:A0 00 A5 FE C5 FF 90 04 B1
2031:F0 1C D0 22 B1 FA 49 FF 39
2039:91 FA C8 C0 08 D0 F5 A5 3B
2041:FE 0A 0A 0A 0A 05 FF A0 6A
2049:00 91 FC 38 B0 08 98 91 79
2051:FA C8 C0 08 D0 F9 A5 FA 8E
2059:18 69 08 85 FA 90 02 E6 5E
2061:FB E6 FC D0 02 E6 FD A5 53
2069:FD C9 1F 90 96 A5 FC C9 17
2071:E8 90 90 60 00 FF FF 00 62
2079:80 01 00 80 01 00 80 01 4C
2081:00 80 01 00 80 01 00 80 8A
2089:01 00 80 01 00 80 01 00 6E
```

```
2091:80 01 00 80 01 00 80 01 64
2099:00 80 01 00 80 01 00 80 A2
20A1:01 00 80 01 00 80 01 00 86
20A9:80 01 00 80 01 00 FF FF 7A
20B1:00 00 00 00 00 F8 1F 00 14
20B9:80 01 00 80 01 00 80 01 8C
20C1:00 00 00 00 00 00 00 00 02
20C9:00 00 00 00 00 00 00 00 0A
20D1:01 80 00 01 80 00 00 00 C6
20D9:00 00 00 00 00 00 00 00 1A
20E1:00 00 00 00 00 80 01 00 26
20E9:80 01 00 80 01 00 F8 1F CB
20F1:00 00 00 00 00 A9 20 85 9E
20F9:84 A9 68 85 86 A2 20 38 83
2101:08 A9 00 85 83 85 85 A0 E7
2109:00 B1 83 D1 85 D0 63 C8 44
2111:C0 FA D0 F5 A5 83 18 69 C0
2119:FA 85 83 85 85 90 04 E6 60
2121:84 E6 86 CA D0 E1 28 90 CB
2129:0D A9 1C 85 84 A9 88 85 99
2131:86 A2 04 18 90 CA A9 1C 80
2139:C5 C4 B0 38 A9 D8 85 84 69
2141:A9 8C 85 86 A9 00 85 83 70
2149:85 85 A2 04 A0 00 B1 83 30
2151:29 0F 51 85 29 0F D0 1B B0
2159:C8 C0 FA D0 F1 A5 83 18 E1
2161:69 FA 85 83 85 85 90 04 67
2169:E6 84 E6 86 CA D0 DD 38 13
2171:B0 02 28 18 60 A9 40 85 C2
2179:FA 20 65 13 A2 04 A0 00 85
2181:20 A7 16 20 A0 13 A9 68 8F
2189:85 FA 20 30 13 A5 D4 C9 F6
2191:58 F0 FA EA 20 65 13 20 27
2199:A0 13 A2 02 A0 14 20 A7 A2
21A1:16 A9 40 85 FA A2 07 86 B0
21A9:FB 86 FD A9 20 85 FC A5 9C
21B1:FA 85 FE A0 00 B1 FD 91 11
21B9:FB 98 18 69 08 A8 90 F5 B3
21C1:E6 FC E6 FE A5 FC C9 40 78
21C9:D0 EB 38 A9 30 A0 00 88 9D
21D1:D0 FD E9 01 B0 F9 CA 10 5C
21D9:CE 60 A2 00 86 FB 86 FD 1F
21E1:A9 20 85 FC A5 FA 85 FE A4
21E9:A0 00 B1 FB 91 FD A9 00 4A
21F1:91 FB 98 18 69 08 A8 90 DD
21F9:F1 E6 FC E6 FE A5 FC C9 4F
2201:40 D0 E7 38 A9 30 A0 00 69
2209:88 D0 FD E9 01 B0 F9 E8 CB
2211:E0 08 D0 C8 60 A2 28 A0 EC
2219:00 88 D0 FD CA D0 FA 60 69
2221:C9 FF D0 03 A9 5E 60 85 A1
2229:B6 4A 4A 4A 4A 4A A8 B9 CF
2231:C0 13 45 B6 60 80 00 40 F3
2239:20 40 C0 80 80 A9 FF 8D F5
2241:0F D4 A9 80 8D 12 D4 A2 80
2249:00 BD 00 14 85 FA BD 01 D2
2251:14 85 FB AD 1B D4 C9 64 7F
2259:B0 F9 29 FE A8 B9 00 14 C9
2261:85 FC B9 01 14 85 FD 8A 2C
2269:48 20 4D 1A 68 AA E8 E8 CD
2271:E0 64 D0 D5 60 00 20 20 1A
2279:20 40 20 60 20 80 20 A0 CB
2281:20 C0 20 E0 20 00 21 20 7B
2289:21 40 26 60 26 80 26 A0 59
2291:26 C0 26 E0 26 00 27 20 8B
2299:27 40 27 60 27 80 2C A0 A0
22A1:2C C0 2C E0 2C 00 2D 20 9B
22A9:2D 40 2D 60 2D 80 2D A0 A6
22B1:2D C0 32 E0 32 00 33 20 29
22B9:33 40 33 60 33 80 33 A0 B6
```

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22C1:33 C0 33 E0 33 00 39 20 70
22C9:39 40 39 60 39 80 39 A0 C6
22D1:39 C0 39 E0 39 00 3A 20 76
22D9:3A 24 3A 3F 50 49 43 2A D7
22E1:2C 44 44 2A 00 1C 00 60 49
22E9:04 00 D8 00 64 04 00 88 07
22F1:00 1C 04 00 8C 00 D8 04 D7
22F9:00 60 00 1C 04 00 64 00 01
2301:D8 04 40 3F 00 1C 04 28 51
2309:43 00 D8 04 00 D8 00 8C 3C
2311:04 00 1C 00 88 04 00 20 51
2319:00 68 20 00 20 00 68 A0 EF
2321:00 1C 00 8C 04 A9 90 85 A4
2329:A8 85 AA A9 23 85 A7 A9 3D
2331:00 85 A9 A8 B1 A7 C9 22 7A
2339:F0 06 C8 C0 03 D0 F5 60 46
2341:C8 98 48 18 65 A7 85 A7 19
2349:90 02 E6 A8 A0 00 B1 A7 CF
2351:C9 22 F0 09 91 A9 C8 C0 39
2359:10 D0 F3 F0 09 A9 A0 91 2B
2361:A9 C8 C0 10 D0 F9 68 85 8C
2369:AB A9 20 38 E5 AB 18 65 EA
2371:A7 85 A7 90 02 E6 A8 A5 8D
2379:A9 18 69 10 85 A9 90 02 BE
2381:E6 AA A0 00 F0 AE A9 04 93
2389:85 FB A9 B7 85 FA A5 A7 4D
2391:48 A5 A8 48 A2 00 A0 0F 64
2399:B1 A7 84 AB 20 AB 13 A4 68
23A1:AB 91 FA 88 10 F2 A5 FA 9C
23A9:18 69 28 85 FA 90 02 E6 B8
23B1:FB A5 A7 18 69 10 85 A7 14
23B9:90 02 E6 A8 C5 A9 D0 09 AF
23C1:A5 A8 C5 AA 90 03 E8 D0 9B
23C9:05 E8 E0 0F D0 C8 68 85 D9
23D1:A8 68 85 A7 60 48 A0 0F 26
23D9:B1 FC 49 80 91 FC 88 10 0B
23E1:F7 68 D0 01 60 4A B0 0C 02
23E9:A5 FC 69 28 85 FC 90 0E 41
23F1:E6 FD B0 0A A5 FC E9 28 FE
23F9:85 FC B0 02 C6 FD A9 00 F9
2401:48 F0 D3 A2 05 A0 00 B1 AA
2409:FA 48 B1 FC 91 FA 68 91 C1
2411:FC C8 C0 20 D0 F1 A5 FA B8
2419:18 69 40 85 FA A9 01 65 0E
2421:FB 85 FB A5 FC 18 69 40 FD
2429:85 FC A9 01 65 FD 85 FD E4
2431:CA D0 D2 A5 FA 38 E9 40 94
2439:85 FA A5 FB E9 26 85 FB 66
2441:A5 FC 38 E9 40 85 FC A5 F8
2449:FD E9 26 85 FD A2 03 46 EE
2451:FB 66 FA 4A 66 FC CA D0 C2
2459:F6 18 69 1C 85 FD A5 FB 7D
2461:69 1C 85 FB A0 00 A2 03 23
2469:B1 FA 48 B1 FC 91 FA 68 F9
2471:91 FC C8 CA 10 F2 98 18 1D
2479:69 24 A8 C0 C8 90 E7 A5 9E
2481:FB C9 30 90 01 60 A5 FB 1A
2489:69 BC 85 FB A5 FD 69 BC DA
2491:85 FD 90 D0 AD 00 D0 38 82
2499:E9 18 85 B2 AD 10 D0 29 31
24A1:01 E9 00 A0 05 4A 66 B2 BF
24A9:88 D0 FA AD 01 D0 38 E9 4A
24B1:32 4A 4A 18 65 B2 0A 85 FF
24B9:B2 60 A9 FF 8D 18 D4 8D AC
24C1:01 D4 A9 80 8D 06 D4 60 8B
24C9:AD 10 D0 29 01 D0 07 A9 9C
24D1:20 CD 00 D0 B0 0E AD 00 C3
24D9:D0 38 E9 20 8D 00 D0 B0 96
24E1:03 CE 10 D0 60 AD 10 D0 19
24E9:29 01 F0 07 AD 00 D0 C9 6E
```

```
24F1:20 B0 F1 AD 00 D0 18 69 6C
24F9:20 8D 00 D0 90 E6 EE 10 D0
2501:D0 60 AD 01 D0 C9 33 90 36
2509:F8 E9 28 8D 01 D0 60 AD E1
2511:01 D0 C9 C8 B0 F8 69 28 3A
2519:8D 01 D0 60 8A 48 A2 00 45
2521:B9 6F 14 95 FA C8 E8 E0 AD
2529:04 D0 F5 84 FE B9 6F 14 82
2531:08 29 7F AA A0 00 B1 FA C7
2539:28 08 10 06 48 B1 FC 91 90
2541:FA 68 91 FC C8 C0 FA D0 35
2549:ED A5 FA 18 69 FA 85 FA 12
2551:90 02 E6 FB A5 FC 18 69 BB
2559:FA 85 FC 90 02 E6 FD CA 9D
2561:D0 D2 A4 FE C8 28 68 AA AF
2569:CA D0 B1 60 AD 20 D0 29 42
2571:0F 85 FF 0A 0A 0A 0A 05 D6
2579:FF 85 FF A2 01 A0 3C 20 72
2581:A7 16 38 08 A9 1C 85 FD 73
2589:A9 88 85 FB A9 00 85 FC 90
2591:85 FA A2 19 A0 00 A5 FF 93
2599:28 08 B0 02 B1 FA 91 FC C9
25A1:C8 C0 28 D0 F1 20 A3 17 01
25A9:A5 FA 18 69 28 85 FA 85 F1
25B1:FC 90 04 E6 FD E6 FB CA DB
25B9:D0 DA 28 90 0C 18 08 A2 A4
25C1:01 A0 37 20 A7 16 18 90 F3
25C9:BB A5 D4 C9 58 F0 FA EA F9
25D1:38 08 A9 1F 85 FD A9 8F 68
25D9:85 FB A9 C0 85 FA 85 FC 47
25E1:A2 19 A0 00 A5 FF 28 08 5D
25E9:B0 02 B1 FA 91 FC C8 C0 C5
25F1:28 D0 F1 20 A3 17 A5 FA 84
25F9:38 E9 28 85 FA 85 FC B0 D0
2601:04 C6 FB C6 FD CA D0 DA 84
2609:28 90 0C 18 08 A2 01 A0 FD
2611:37 20 A7 16 18 90 BB 60 32
2619:A9 0D 85 FE A9 00 18 69 05
2621:01 D0 FB C6 FE D0 F5 60 95
2629:A9 00 20 BD FF A9 01 A2 75
2631:08 A0 0F 20 BA FF 20 C0 64
2639:FF A2 01 20 C6 FF A2 00 CB
2641:20 CF FF C9 0D F0 09 20 8C
2649:AB 13 9D 73 07 E8 D0 F0 89
2651:A9 01 20 C3 FF 4C CC FF BD
2659:A5 FD C9 04 D0 06 A5 FC 58
2661:C9 B7 F0 06 A9 01 20 60 F0
2669:15 60 A5 A8 C9 90 D0 05 CE
2671:A5 A7 D0 01 60 A5 A7 38 C5
2679:E9 10 85 A7 B0 02 C6 A8 AD
2681:20 61 18 A9 00 4C 60 15 DA
2689:A5 FB 48 A5 FA 38 E9 28 BF
2691:B0 02 C6 FB C5 FC D0 06 19
2699:A5 FD C5 FB F0 07 A9 02 A9
26A1:20 60 15 F0 2D A5 A9 38 53
26A9:E5 A7 85 B0 A5 AA E5 A8 DA
26B1:85 B1 A0 04 46 B1 66 B0 F7
26B9:88 D0 F9 E4 B0 F0 13 A5 21
26C1:A7 18 69 10 85 A7 90 02 04
26C9:E6 A8 20 61 18 A9 00 20 55
26D1:60 15 68 85 FB 60 20 11 AB
26D9:15 A5 A8 C9 90 D0 10 A5 59
26E1:A7 D0 0C A9 40 A0 10 99 90
26E9:8E 04 88 D0 FA F0 04 A9 E9
26F1:2D D0 F2 A5 A9 38 E5 A7 63
26F9:85 B0 A5 AA E5 A8 85 B1 23
2701:A0 04 46 B1 66 B0 88 D0 5C
2709:FB A9 40 E4 B0 F0 02 A9 0D
2711:2D A0 0F 91 FA 88 10 FB 2F
2719:60 A5 FC 38 E9 B7 85 BB 19
```

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2721:A5 FD E9 04 85 BC A0 00 9F
2729:A5 BB 38 E9 28 85 BB B0 5E
2731:02 C6 BC A5 BC 30 03 C8 99
2739:D0 EE 84 BB 98 0A 0A 0A 03
2741:0A 18 65 A7 AA A9 00 65 23
2749:A8 A8 A9 10 20 BD FF A9 ED
2751:00 AA 20 68 FF A2 08 A8 18
2759:20 BA FF AA B1 BB A0 1C EA
2761:C9 44 F0 08 A0 20 C9 81 DE
2769:F0 02 A0 90 8A 20 D5 FF 4E
2771:90 A6 20 B3 17 A9 00 85 D5
2779:A2 A9 70 C5 A2 B0 FC A0 60
2781:24 A9 20 99 73 07 88 10 C2
2789:FA 38 60 AD 8F 04 C9 20 8A
2791:F0 05 A9 00 20 60 15 A0 1C
2799:0A B9 00 0B 99 7D 07 88 65
27A1:10 F7 20 E5 19 F0 FB 48 25
27A9:20 0A 19 68 C9 03 D0 0F 3F
27B1:AD 8F 04 C9 20 F0 E0 A9 08
27B9:00 20 60 15 4C 9A 19 A2 0F
27C1:03 BD 0B 0B 95 E4 CA 10 F8
27C9:F8 20 7D FF 9E 93 00 A2 32
27D1:64 A0 14 A9 0B 20 D7 18 38
27D9:B0 BD 20 B0 14 A5 AA C9 55
27E1:90 D0 14 A5 A9 D0 10 A0 DA
27E9:17 B9 0F 0B 99 77 07 88 06
27F1:10 F7 20 00 19 B0 A0 A9 C0
27F9:00 85 A7 A9 90 85 A8 20 45
2801:61 18 A9 04 85 FD A9 B7 AC
2809:85 FC A9 00 20 60 15 20 5D
2811:E5 19 F0 FB C9 91 D0 06 B4
2819:20 E3 17 4C 9A 19 C9 11 F7
2821:D0 06 20 13 18 4C 9A 19 D0
2829:C9 44 D0 03 4C 16 19 C9 70
2831:51 D0 1C A0 09 B9 27 0B 74
2839:99 7D 07 88 10 F7 20 E5 A5
2841:19 F0 FB C9 59 D0 03 4C D6
2849:E2 0B 20 0A 19 B0 C0 C9 49
2851:0D D0 BC 20 EE 19 B0 B7 EA
2859:90 11 86 C8 20 E4 FF A6 CE
2861:C8 A8 60 86 C8 20 A4 18 DC
2869:A6 C8 60 A9 72 85 01 A5 37
2871:C4 C9 20 D0 18 AD 10 47 86
2879:85 C8 8D 20 D0 8D 21 D0 42
2881:20 A0 0B AD 11 D0 09 10 34
2889:8D 11 D0 D0 10 20 DA 0B CD
2891:20 A7 16 EA A9 00 8D 20 D5
2899:D0 A9 20 85 D8 A0 00 98 FA
28A1:99 00 D4 C8 C0 19 D0 F8 EA
28A9:A9 F0 8D 06 D4 A9 11 8D 1A
28B1:04 D4 A9 8F 8D 18 D4 20 FD
28B9:00 19 20 C8 13 20 C8 13 9E
28C1:F0 09 AD 1B D4 8D 01 D4 E7
28C9:4C 8E 15 A9 10 8D 04 D4 B4
28D1:A9 38 8D F8 1F A9 39 8D E5
28D9:F9 1F A9 18 8D 00 D0 8D 41
28E1:02 D0 A9 32 8D 01 D0 8D 5F
28E9:03 D0 A9 00 8D 10 D0 A9 1D
28F1:01 8D 15 D0 A9 03 8D 17 61
28F9:D0 8D 1D D0 A9 00 85 CB EA
2901:85 CA E6 CB A5 CB C9 33 85
2909:90 1B A9 00 85 CB A4 CA 0F
2911:B9 7A 0B 8D 27 D0 B9 7C 85
2919:0B 8D 28 D0 C8 C0 0E D0 9C
2921:02 A0 00 84 CA A5 D4 C9 45
2929:58 F0 D7 C9 21 D0 06 20 F3
2931:8D 16 4C 67 1B C9 25 D0 EA
2939:06 20 9A 16 4C 67 1B C9 4B
2941:22 D0 06 20 53 16 4C 67 8E
2949:1B C9 2A D0 06 20 70 16 95
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2951:4C 67 1B C9 40 D0 1F AD D4
2959:15 D0 85 C9 A9 00 8D 15 35
2961:D0 A5 C4 C9 20 D0 05 20 29
2969:00 13 30 03 20 F7 16 A5 69
2971:C9 8D 15 D0 D0 86 C9 3F 2F
2979:D0 7F AD 15 D0 85 C9 A9 F4
2981:73 85 01 A9 00 8D 15 D0 DA
2989:8D 20 D0 8D 21 D0 85 D8 CD
2991:A0 12 B9 31 0B 99 79 07 BB
2999:88 10 F7 20 8A 0B EA EA 76
29A1:C9 19 D0 16 20 0A 19 A9 9F
29A9:04 85 FD A9 B7 85 FC 20 A7
29B1:61 18 A9 00 20 60 15 4C E8
29B9:9A 19 A9 72 85 01 A5 C9 41
29C1:8D 15 D0 A0 00 A2 20 A5 B4
29C9:C4 C9 20 D0 04 A2 A0 A4 92
29D1:C8 8C 20 D0 8C 21 D0 86 CD
29D9:D8 4C 8D 1A 20 45 16 A9 EA
29E1:81 8D 04 D4 A0 00 8C 05 49
29E9:D4 C8 D0 FD 8C 04 D4 84 75
29F1:A2 A5 A2 C9 0A D0 FA F0 6A
29F9:E0 C9 3C D0 5A AD 15 D0 48
2A01:29 02 D0 31 AD 00 D0 8D 34
2A09:02 D0 AD 01 D0 8D 03 D0 EB
2A11:A0 00 AD 10 D0 29 01 F0 8A
2A19:02 A0 03 8C 10 D0 20 1F E2
2A21:16 A6 B2 BD 00 14 85 B5 6D
2A29:BD 01 14 85 B6 A9 03 8D 67
2A31:15 D0 38 B0 37 A5 B5 85 97
2A39:FA A5 B6 85 FB 20 1F 16 58
2A41:A6 B2 BD 00 14 85 FC BD BB
2A49:01 14 85 FD A9 01 8D 15 35
2A51:D0 20 8E 15 38 B0 15 C9 B1
2A59:14 D0 06 20 80 0E 4C D2 56
2A61:08 C9 39 D0 0D A9 01 8D FE
2A69:15 D0 D0 06 A5 D4 C9 3C 47
2A71:F0 FA 4C 8D 1A 78 A9 0E 73
2A79:8D 00 FF A9 1B 8D 11 D0 31
2A81:A9 C8 8D 16 D0 A9 15 8D D4
2A89:18 D0 A9 FC 8D 30 D0 A9 9B
2A91:93 20 D2 FF A0 38 8C F8 0A
2A99:07 C8 8C F9 07 A0 09 B9 5B
2AA1:00 10 99 80 09 A9 00 99 BD
2AA9:00 10 88 10 F2 85 D7 85 F6
2AB1:D8 8D 15 D0 8D 1C D0 8D 91
2AB9:20 D0 8D 21 D0 A9 2B 85 1F
2AC1:FD A9 04 85 FB A9 B5 85 CF
2AC9:FC A0 00 84 FA B1 FC D0 76
2AD1:21 E6 FC D0 02 E6 FD B1 76
2AD9:FC F0 27 48 A8 88 A9 20 2D
2AE1:91 FA 88 10 FB C8 68 18 BB
2AE9:65 FA 85 FA 90 0C E6 FB 8E
2AF1:D0 08 91 FA E6 FA D0 02 59
2AF9:E6 FB E6 FC D0 CF E6 FD FE
2B01:D0 CB A9 D8 85 FB A0 00 D2
2B09:84 FA B9 BF 2C 84 FE A0 A5
2B11:00 91 FA 48 A4 FE B9 C0 05
2B19:2C 85 FF A8 68 88 F0 05 BD
2B21:91 FA 38 B0 F8 A5 FF 18 87
2B29:65 FA 85 FA 90 02 E6 FB A7
2B31:A4 FE C8 C8 C0 42 90 D2 42
2B39:A9 08 85 FB A9 1C 85 FD 9D
2B41:A9 11 85 FC A0 00 84 FA 3A
2B49:B1 FC 91 FA E6 FC D0 02 68
2B51:E6 FD E6 FA D0 02 E6 FB 7F
2B59:A5 FB C9 09 90 EA A5 FA C1
2B61:C9 65 90 E4 A9 0B 85 FB D6
2B69:84 FA B1 FC 91 FA E6 FC 0A
2B71:D0 02 E6 FD E6 FA D0 02 34
2B79:E6 FB A5 FB C9 0F 90 EA 4D
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2B81:A9 13 85 FB B1 FC 91 FA 81
2B89:E6 FC D0 02 E6 FD E6 FA C4
2B91:D0 02 E6 FB A5 FB C9 1C 3A
2B99:90 EA A9 65 8D 14 03 A9 EA
2BA1:FA 8D 15 03 58 20 7D FF E9
2BA9:0E 0B 00 A9 00 85 D0 85 A1
2BB1:D1 4C 58 0B 00 0D 4A 49 D1
2BB9:47 53 41 57 20 20 02 19 C4
2BC1:20 45 0D 09 0C 20 48 05 22
2BC9:19 12 0F 16 13 0B 19 00 6B
2BD1:0F 63 63 63 63 63 63 00 9A
2BD9:15 49 0E 20 14 08 09 13 B6
2BE1:20 13 03 12 05 05 0E 3A 21
2BE9:00 19 03 15 12 13 0F 12 45
2BF1:20 0B 05 19 13 20 01 0E 76
2BF9:04 00 19 D2 C5 D4 D5 D2 A2
2C01:CE 20 14 0F 20 13 05 0C 9F
2C09:05 03 14 2E 00 17 C4 20 10
2C11:0E 05 17 20 04 09 13 0B 0C
2C19:2E 00 1D D1 20 11 15 09 C1
2C21:14 2E 00 21 49 0E 20 4A 2E
2C29:49 47 53 41 57 20 13 03 DA
2C31:12 05 05 0E 3A 00 17 C9 1F
2C39:2C CA 2C CB 2C CC 20 0D 7E
2C41:0F 16 05 00 1C 06 12 01 65
2C49:0D 05 2E 00 22 D3 D0 C1 F2
2C51:C3 C5 20 0D 01 12 0B 20 58
2C59:26 20 13 17 01 10 00 17 FF
2C61:14 17 0F 20 10 09 05 03 1F
2C69:05 13 2E 00 1D 9F 20 15 8B
2C71:0E 0D 01 12 0B 20 01 20 50
2C79:13 05 0C 05 03 14 05 04 E4
2C81:00 15 10 09 05 03 05 2E 1E
2C89:00 22 C8 C5 CC D0 20 08 D1
2C91:05 0C 10 2E 00 1E C3 20 74
2C99:03 0F 0E 06 09 12 0D 2E 32
2CA1:00 1E D3 D4 CF D0 20 02 4D
2CA9:01 03 0B 20 14 0F 20 14 D7
2CB1:08 09 13 00 17 13 03 12 CF
2CB9:05 05 0E 2E 00 00 0E 0D A3
2CC1:07 06 0E 3D 07 0F 0E 41 86
2CC9:03 06 0E 22 03 01 0E 27 68
2CD1:03 01 0E 27 07 11 0E 17 CF
2CD9:03 01 0E 01 03 01 0E 01 FE
2CE1:03 01 0E 01 03 01 0E 49 4F
2CE9:03 05 0E 4B 03 01 0E 4F 03
2CF1:03 04 0E 24 03 01 0E 27 30
2CF9:03 04 0E EC 0D 27 0E 51 D7
2D01:00 00 00 00 00 00 00 00 5B
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SPLAST

By William F. Snow

Splast is an enjoyable way to practice spelling words. There are a lot of spelling programs around, but Splast has some advantages. It's both fun to play and challenging. Because Splast presents the words in the same format used by some popular standardized tests, it's also great practice for taking tests!

Splast is written in BASIC. To help avoid typing errors, enter the program with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you attempt to run it.

How to Use the Program

To play Splast, simply load the program and type *RUN*. The first screen gives instructions for playing the game. The player is then asked to give his or her initials and to choose a level of play.

After a level of play is chosen, the game begins. The Splaster, located at the bottom of the screen, is controlled by a joystick in port 2. Three words are flashed on the screen. Two of them are spelled correctly, and one is misspelled. The player must position the Splaster beneath the misspelled word and hit the fire button. Move fast because the words don't stay on the screen for long. The Splaster launches an arrow at the selected word, so be sure your aim is as accurate as your spelling.

The skill levels are 1–3, with 1 being the easiest. As the levels increase, the time given to find and splast the incorrect word decreases, but the points awarded for each Splasted word increase. The program keeps track of the high score achieved during each session so that players can compete with each other.

After all the words have been presented, you get a screen that gives your score and lists both the words you spelled correctly and the ones you missed. You then have the opportunity to play again or quit.

Because Splast is written in BASIC, it's easy to modify. The words used are in data statements in lines 1340–1360. The program is set to use 25 words. If you use a different number of words, you'll have to make a few changes to the program. You'll need to change the dimension statements and the FOR-NEXT loop in line 20, the FOR-NEXT loops in lines 290 and 310, the CT value in lines 350 and 470, the random number generator in lines 370 and 380, the divisor in line 920, and the FOR-NEXT loops in lines 1090 and 1140.

If all the words in a given list are long, there may be a problem with the right-hand word wrapping around the screen. This shouldn't happen often, however.

In my fifth-grade classroom, I have a disk with 36 versions of Splast, one for each weekly spelling unit. The children really enjoy using it to study the words. After the program itself is typed in, it really doesn't take long to change word lists. A parent or teacher might even have the child or children type in the words.

SPLAST

```
BM 0 REM COPYRIGHT 1993 - COMP
     UTE PUBLICATIONS INTL LTD
      -ALL RIGHTS RESERVED
RF 10 REM SPLAST BY WILLIAM F.
       SNOW
HD 20 DIMWD$(25),Y(25),R$(25),
      WW$(25),RW$(25):FOR I=1
      {SPACE}TO 25:READ WD$(I)
      :NEXT
GC 30 A$=CHR$(65):E$=CHR$(69):
      I$=CHR$(73):O$=CHR$(79):
      U$=CHR$(85):V=53248:SL=5
      4272
MJ 40 FORS=12288 TO 12351:READ
       SP:POKE S,SP:NEXT
PQ 50 FORS=12352 TO 12415:READ
       SP:POKE S,SP:NEXT
EK 60 POKE53280,1:POKE53281,13
      :PRINT"{BLK}{CLR}
      {3 DOWN}"SPC(17)"{RED}SP
      LAST{BLK}"
EM 70 PRINT:PRINT"{4 RIGHT}THE
       OBJECT OF {RED}SPLAST
      {BLK} IS TO FIND THE MIS
      PELLED WORD";
FQ 80 PRINT" AND '{RED}SPLAST
      {BLK}' IT OFF THE
      {2 SPACES}SCREEN.";
DF 90 PRINT" YOU ARE GIVEN THR
      EE WORDS AT A{2 SPACES}T
      IME.";
BF 100 PRINT" TWO OF THEM ARE
       {SPACE}SPELLED CORRECTL
       Y AND ONE IS WRONG.";
KS 110 PRINT" YOU MUST POSITIO
       N";
FA 120 PRINT" YOUR'{RED}SPLAST
       ER{BLK}' UNDER THE MISP
       ELLED WORD{5 SPACES}(US
       ING A JOYSTICK ";
BG 130 PRINT"IN PORT TWO) AND
       {SPACE}HIT{2 SPACES}THE
        FIRE BUTTON.";
CR 140 PRINT:PRINT"{4 RIGHT}TH
       ERE ARE THREE LEVELS.";
KC 150 PRINT"AS THE LEVELSINCR
       EASE YOU ARE GIVEN";
AQ 160 PRINT" LESS TIME TO
       {5 SPACES}FIND THE INCO
       RRECT WORD.
GD 170 PRINTSPC(9)"{4 DOWN}HIT
        ANY KEY TO BEGIN
```

```
CS 180 GET WW$:IF WW$=""THEN18
       0
AS 190 RC=1:INPUT"{CLR}
       {2 DOWN}{3 RIGHT}PLEASE
        ENTER YOUR INITIALS";I
       N$
XJ 200 RC=1:PRINT"{2 DOWN}
       {3 RIGHT}WHAT SKILL LEV
       EL ?"
SH 210 PRINT:PRINTSPC(10)"1) B
       EGINNER":PRINT:PRINTSPC
       (10)"2) AVERAGE
EJ 220 PRINT:PRINTSPC(10)"3) E
       XPERT
AS 230 GET PL$:IFPL$="1"ORPL$=
       "2"ORPL$="3"THEN250
DB 240 GOTO230
MB 250 PL=VAL(PL$)
GQ 260 PRINT"{CLR}{5 DOWN}"SPC
       (14)"PLEASE{2 SPACES}WA
       IT":PRINT:PRINTSPC(12)"
       SCRAMBLING WORDS"
JF 270 POKE2040,192:POKEV+21,1
       :POKEV+39,6
GQ 280 POKEV,130:POKEV+1,220
DC 290 FORI=1 TO 25
JP 300 X=INT(RND(.)*25)+1
JC 310 FORCK=1 TO 25:IFX=Y(CK)
       THEN300
KC 320 NEXT CK:Y(I)=X
QF 330 R$(X)=WD$(I):NEXTI
DX 340 CT=1
CJ 350 POKEV+31,0:IF CT>25 THE
       N920
JB 360 ES=0:XA=130:POKEV,XA:GO
       SUB520
QR 370 WG=INT(RND(.)*25)+1:WG$
       =R$(WG):IFWG$=R$(CT)THE
       N370
GM 380 WH=INT(RND(.)*25)+1:WH$
       =R$(WH):IFWH$=WG$ORWH$=
       R$(CT)THEN380
QE 390 C=INT(RND(.)*3)+1:ON C
       {SPACE}GOSUB770,780,790
GA 400 IF PL=1 THEN FOR FL=1TO
       25:IF ES=1 THEN460
FM 410 IF PL=2 THEN FOR FL=1TO
       20:IF ES=1 THEN460
PB 420 IF PL=3 THEN FOR FL=1TO
       15:IFES=1 THEN460
FQ 430 CK=0:PRINT"{CLR}
       {7 DOWN}{3 RIGHT}"WO$(1
       )SPC(4)WO$(2)SPC(4)WO$(
       3)
BK 440 CL=0:GOSUB680
FK 450 IF CL=1 THEN GOSUB870
PQ 460 NEXTFL
GA 470 POKEV+31,0:IF CT>25 THE
       N920
JC 480 IF ES=1 THENRW=RW+1:RW$
       (RW)=R$(CT):WW$(CT)=""
KS 490 IF ES<>1 THEN GOSUB1330
       :WW=WW+1:WW$(WW)=R$(CT)
       :RN=0
GB 500 CT=CT+1
RE 510 GOTO350
RF 520 WL=LEN(R$(CT)):L=INT(RN
       D(.)*WL+1):LE$=MID$(R$(
       CT),L,1):LE=ASC(LE$)
AQ 530 LT$=CHR$(LE)
GH 540 IFLT$=A$ OR LT$=E$ OR L
       T$=I$ OR LT$=O$ OR LT$=
       U$ THEN560
JG 550 GOTO520
KJ 560 RV=INT(RND(.)*5)+1:ONRV
        GOTO570,580,590,600,61
       0
MX 570 V$=A$:GOTO620
DC 580 V$=E$:GOTO620
PA 590 V$=I$:GOTO620
JG 600 V$=O$:GOTO620
RH 610 V$=U$
MK 620 IF V$=LT$ THEN560
AA 630 RW$=LEFT$(R$(CT),L-1)
FG 640 RM=WL-(L):IFRM<1THEN520
DB 650 LW$=RIGHT$(R$(CT),RM)
EP 660 NW$=RW$+V$+LW$
QB 670 RETURN
JQ 680 JY=PEEK(56320)AND15:FB=
       PEEK(56320)AND16
FX 690 IF JY=7THEN XA=XA+10:IF
        XA>250THEN XA=250
FH 700 IF JY=11 THEN XA=XA-10:
       IF XA<30 THEN XA=30
PF 710 POKEV,XA:IF FB=0 THEN G
       OSUB730:RETURN
FC 720 RETURN
FC 730 POKEV+31,0:POKE2041,193
       :POKEV+21,3:POKEV+2,XA:
       POKEV+40,2
GG 740 FOR Y=220 TO 50 STEP-1:
       POKEV+3,Y
HJ 750 IF PEEK(V+31)AND2=2THEN
       CL=1:RETURN
KG 760 NEXT:RC=0:POKEV+21,PEEK
       (V+21)AND(255-2):GOSUB1
       300:RETURN
QF 770 WO$(1)=NW$:WO$(2)=WG$:W
       O$(3)=WH$:CW=1:RETURN
PR 780 WO$(1)=WG$:WO$(2)=NW$:W
       O$(3)=WH$:CW=2:RETURN
MB 790 WO$(1)=WG$:WO$(2)=WH$:W
       O$(3)=NW$:CW=3:RETURN
PX 800 PRINT"{CLR}{12 DOWN}
       {4 RIGHT}YOU SPLASTED T
       HREE IN A ROW"
SC 810 PRINT:PRINT"{8 RIGHT}WI
       THOUT A MISTAKE !!!":FO
       R RC=1 TO 2500:NEXT
HD 820 RC=0:PRINT"{CLR}":POKE5
       3281,1:POKEV+40,0:FORWA
       =1 TO 500:NEXT
KM 830 FORI=1TO15:PW=INT(RND(.
       )*50):PRINTSPC(PW)"
       {BLK}NICE GOING!":NEXT
HE 840 FOR WA=1 TO 2000:NEXT:P
       OKE53281,13
BS 850 POKEV+21,PEEK(V+21)AND(
       255-2):POKEV+29,0:POKEV
       +23,0:CW=0:POKEV+3,0
BM 860 GOSUB1330
PB 870 IFXA<109 AND CW=1 THEN
       {SPACE}GOSUB1170:ES=1:R
       ETURN
PQ 880 IFXA<205ANDXA>109ANDCW=
       2THENGOSUB1170:ES=1:RET
       URN
HP 890 IF XA>189 AND CW=3 THEN
        GOSUB1170:ES=1:RETURN
EM 900 IF ES=0 THEN GOSUB1300
BD 910 POKEV+21,PEEK(V+21)AND(
       255-2):POKEV+3,0:RC=0:R
       ETURN
BS 920 RP=INT((RW/25)*100):POK
       EV+21,0
SS 930 PRINT"{CLR}{2 DOWN}YOU
       {SPACE}SPLASTED "RP"% O
       F THE WORDS"
HB 940 PRINT"{DOWN}{2 RIGHT}TH
       E WORDS YOU GOT CORRECT
        ARE":PRINT
SK 950 FORI=1 TO RW:PRINTRW$(I
       ),:NEXT
SE 960 PRINT"{HOME}{15 DOWN}
       {2 RIGHT}THE WORDS YOU
       {SPACE}GOT WRONG ARE":P
       RINT
GE 970 FORI=1 TO WW:PRINTWW$(I
       ),:NEXT
KR 980 PRINT:PRINTSPC(8)"{WHT}
       HIT ANY KEY TO CONTINUE
       {BLK}"
QK 990 GET WA$:IF WA$=""THEN99
       0
CF 1000 PRINT"{CLR}{5 DOWN}"SP
        C(13)IN$"'S SCORE WAS
        {SPACE}"SC
ES 1010 PRINT:PRINT"{3 SPACES}
        THE BEST SCORE FOR THI
        S SESSION IS"
HR 1020 IFIN$=HN$THEN1040
DC 1030 IFSC=HSTHENPRINT"
        {4 SPACES}A TIE BETWEE
        N "IN$" AND "HN$" WITH
         "SC:GOTO1060
HB 1040 IFSC>HSTHEN HS=SC:HN$=
        IN$
PR 1050 PRINT:PRINTSPC(15)HN$"
        'S{2 SPACES}"HS
GE 1060 PRINT"{5 DOWN}
        {3 SPACES}WOULD YOU LI
        KE TO TRY AGAIN (Y/N)"
EF 1070 GET PA$:IF PA$="Y"OR P
        A$="N"THEN1090
SH 1080 GOTO1070
JE 1090 IF PA$="Y"THENFORER=1T
        O25:Y(ER)=0:RW$(ER)=""
        :WW$(ER)="":NEXT
XM 1100 IFPA$="Y" THEN RW=0:WW
        =0:SC=0:GOTO200
BE 1110 PRINT"{CLR}{6 DOWN}IS
        {SPACE}THERE ANYONE EL
        SE WHO WANTS TO PLAY ?
        ":PRINTSPC(15)"(Y,N)"
JG 1120 GET PB$:IF PB$="Y"OR P
        B$="N"THEN1140
GH 1130 GOTO1120
PD 1140 IF PB$="Y"THENFORER=1T
        O25:Y(ER)=0:RW$(ER)=""
        :WW$(ER)="":NEXT
EB 1150 IFPB$="Y"THENRW=0:WW=0
```

```
        :SC=0:GOTO190
RJ 1160 END
BC 1170 IF PL=1 THEN SC=SC+10
QS 1180 IF PL=2 THEN SC=SC+12
EE 1190 IF PL=3 THEN SC=SC+15
JQ 1200 RN=RN+1:FOR LL=SL TO S
        L+24:POKE LL,0:NEXT:PO
        KE SL+24,15
XK 1210 POKE SL+5,64:POKE SL+6
        ,136
RP 1220 POKESL+1,28:POKE SL,49
        :POKE SL+4,33:FOR SN=1
         TO 750:NEXT
FP 1230 POKESL+1,38:POKESL,38:
        POKESL+4,33:FORSN=1TO7
        00:NEXT
FM 1240 POKE SL+4,32:FOR T=1 T
        O 50:NEXT
EH 1250 POKE SL+1,56:POKE SL,9
        9:POKE SL+4,33:FOR SN=
        1 TO 700:NEXT
SF 1260 POKE SL+4,32:FOR T=1 T
        O 500:NEXT
CB 1270 POKEV+21,PEEK(V+21)AND
        (255-2):POKEV+3,0
FD 1280 IF RN=3 THEN GOSUB800:
        RN=0
BD 1290 RETURN
AQ 1300 FORLL=SLTOSL+24:POKELL
        ,0:NEXT:POKESL+24,15:P
        OKESL+5,34:POKESL+6,20
        0
XD 1310 POKESL+1,8:POKESL,97:P
        OKESL+4,33:FORSN=1TO17
        00:NEXT:POKESL+4,32
EM 1320 FOR SN=1 TO 50:NEXT:RN
        =0:RETURN
MC 1330 PRINT"{CLR}":FORRC=1 T
        O 1000:NEXT:ES=1:RETUR
        N
DP 1340 DATAGRACE,GRAZE,WHALE,
        BRAKE,OPERATE,MISTAKE,
        ESCAPE,GRAPES,SAFELY
FR 1350 DATACRAZY,BREAK,GREATE
        ST,FARE,SCARE,SQUARE,C
        OMPARE,PREPARING,SCARC
        E
KM 1360 DATACANARY,RARELY,RELA
        TED,RELAXATION,REPUTAT
        ION,BARE,RARE
DX 1370 DATA000,000,000,000,00
        0,000,000,000
BP 1380 DATA000,000,000,000,00
        0,024,000,000
XJ 1390 DATA024,000,000,024,00
        0,000,024,000
HJ 1400 DATA000,024,000,062,02
        4,124,002,024
HJ 1410 DATA064,002,024,064,00
        2,024,064,127
AQ 1420 DATA255,254,064,060,00
        2,064,060,002
CB 1430 DATA066,060,066,064,06
        0,002,067,255
QB 1440 DATA194,071,255,226,07
        9,255,242,000
HC 1450 DATA000,000,000,000,00
        0,000,000,000
MC 1460 DATA000,000,000,000,00
        0,000,000,000
HE 1470 DATA000,000,000,008,00
        0,000,028,000
KC 1480 DATA000,042,000,000,07
        3,000,000,073
MA 1490 DATA000,000,073,000,00
        0,008,000,000
EG 1500 DATA008,000,000,008,00
        0,000,008,000
AX 1510 DATA000,008,000,000,00
        8,000,000,008
GS 1520 DATA000,000,008,000,00
        0,008,000,000
```

William Snow, the author of Scud, is a teacher. He lives in McHenry, Illinois.□

ONLY ON DISK

In addition to the type-in programs found in each issue of the magazine, Gazette Disk offers bonus programs. Here's a special program that you'll find only on this month's disk.

Brush Strokes
By Maurice Yanney
Lebanon, PA

The object of this arcade-style game for the 64 is to guide a number of randomly moving paint brushes over empty boxes that need painting. With a joystick in port 2 you control a pencil that draws or erases lines on the screen. Since the brushes can't cross a line, you can maneuver them toward the boxes.

Of course, it's not as easy at it sounds. If a brush touches a pencil, the pencil is ruined. You have only so many pencils during a game. Boxes must be painted within a time limit, too, so keep an eye on the clock. When you finish painting one level, you move on to another with an extra brush and set of boxes added each time you advance.

You can have this program, our PD picks, and all the others that appear in this issue by ordering the October Gazette Disk. The U.S. price is $9.95 plus $2.00 shipping and handling. Send your order to Gazette Disk, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

TYPING AIDS

MLX, our machine language entry program for the 64 and 128, and The Automatic Proofreader are utilities that help you type in Gazette programs without making mistakes. To make room for more programs, we no longer include these labor-saving utilities in every issue, but they can be found on each Gazette Disk and are printed in all issues of Gazette through June 1990.

If you don't have access to a back issue or to one of our disks, write to us, and we'll send you free printed copies of both of these handy programs for you to type in. We'll also include instructions on how to type in Gazette programs. Please enclose a self-addressed, stamped envelope. Send a self-addressed disk mailer with postage to receive these programs on disk.

Write to Typing Aids, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

ATTENTION WRITERS PROGRAMMERS

Gazette wants to purchase and publish your utiities, applications, games, educational programs, and tutorial articles. If you've created a program that you think other readers might enjoy or find useful, send it and the documentation on disk to the following address.

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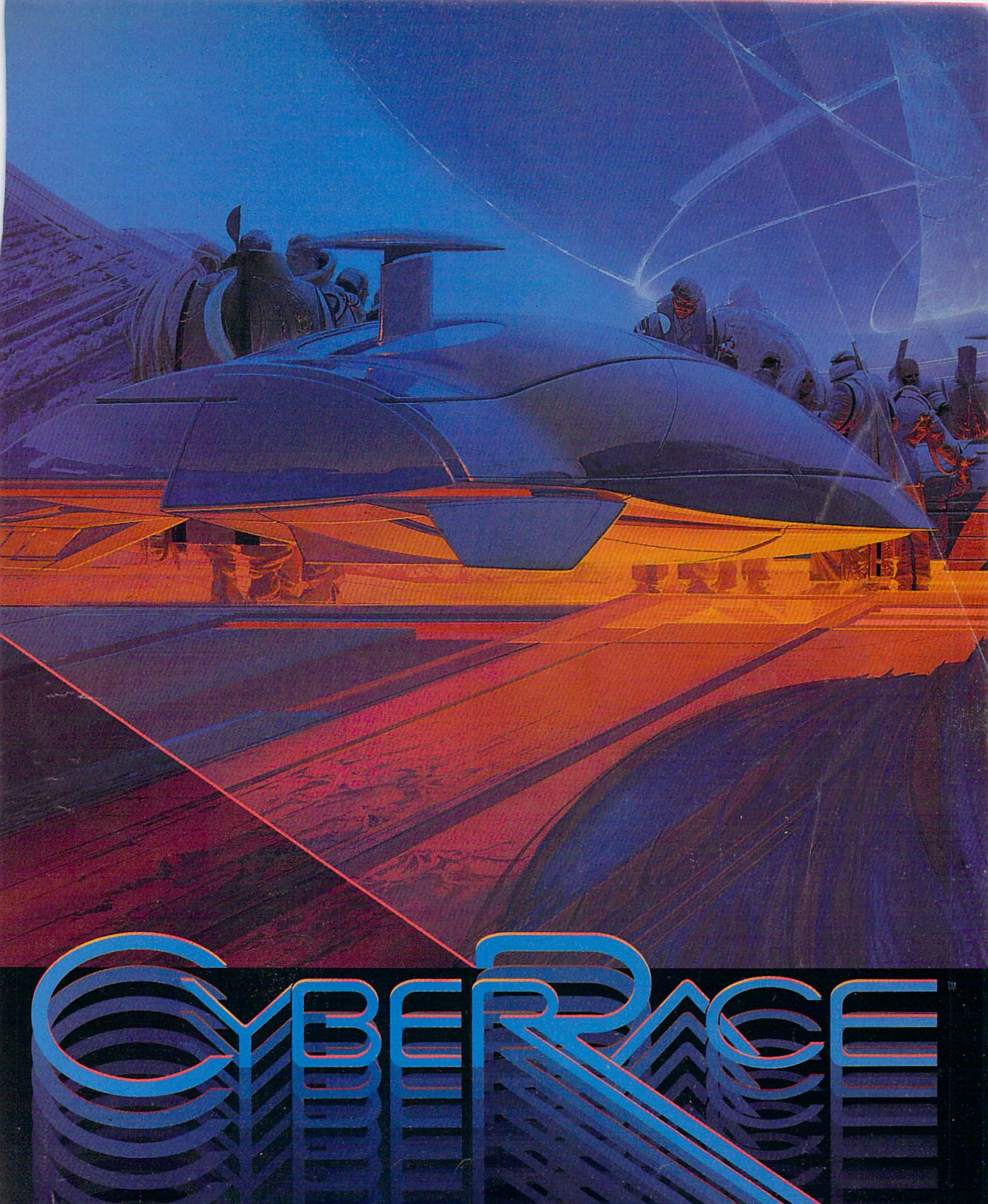
Please enclose an SASE if you want to have your material returned.



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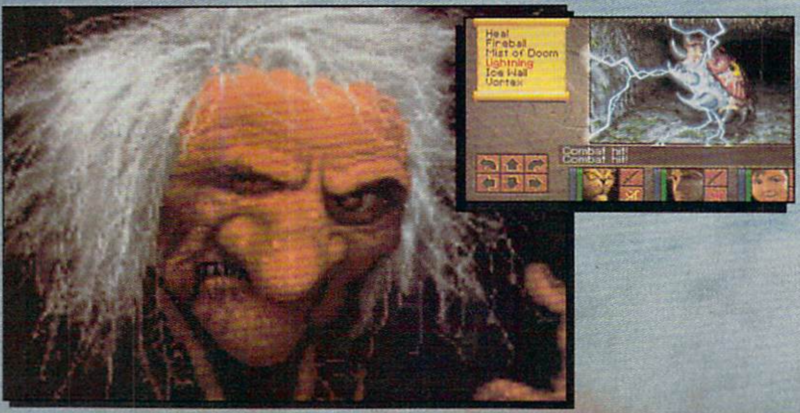
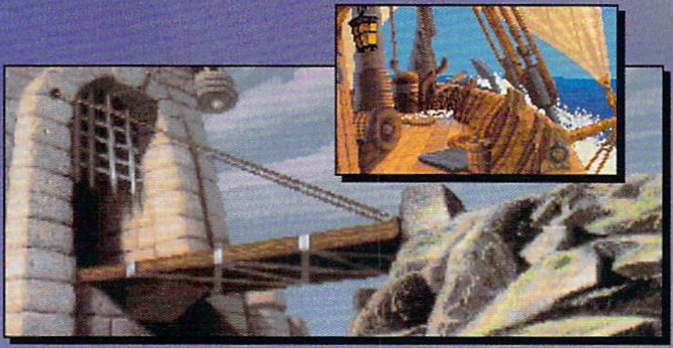

Heal
Fireball
Mist of Doom
Lightning
Ice Wall
Vortex
Combat hit!
Combat hit!

CAN YOU STOP HER? DO YOU DARE?



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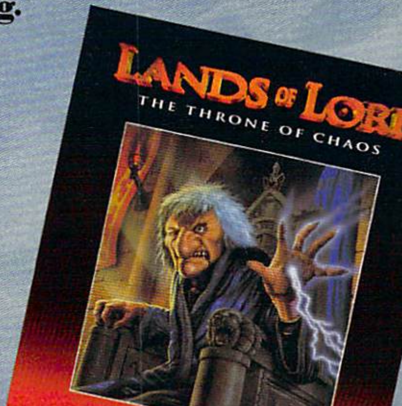

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REVIEWS

NMC UNIVERSAL WINSTATION 433

The Universal Winstation 433 is a pleasant surprise. I've seen many PC systems from small companies over the years, and I'm usually wary of them. Too often, they're designed to sell for the lowest possible price, and they tend to show it—such systems often have flimsy cases, expansion devices that don't work well together, and mushy keyboards. Not so with NMC's Universal Winstation 433. Although this computer comes from a small Utah company that you may never have heard of, it shows all the quality you'd expect from a Dell, Compaq, or IBM machine.

The Winstation I evaluated was configured as a multimedia system, and it meets the new MPC Level 2 specification. No slow, afterthought CD-ROM drive and no-name sound card here—the system sports a Pro AudioSpectrum 16 sound card and a blazingly fast Toshiba CD-ROM drive. The PAS 16 is an impressive board, with 16-bit stereo sound, full Sound Blaster emulation, and software control of all board settings—you can even change the volume from the keyboard while playing a game. The dual-speed Toshiba CD-ROM drive uses a SCSI-2 interface and has a data transfer rate of up to 330K per second and an average access time of 200 ms; it also has a 256K cache that speeds things even more.

The rest of the system exhibits similar quality. The 1MB STB PowerGraph SVGA card uses an S3 accelerator and a VESA local-bus connection to provide exemplary performance in both Windows and DOS. The board supports 24-bit true color in 640 × 480 mode, 16-bit color at 800 × 600, and 256 colors at 1024 × 768; a handy utility lets you change modes without using Windows Setup. The 200MB Western Digital IDE hard drive is supported through an uncached 32-bit local-bus IDE controller. The system has eight slots (two have VLB extensions), five of which are available in the multimedia configuration. The case opens without a screwdriver, making expansion a snap.

With local-bus peripherals and a 256K secondary processor cache, the Winstation's performance is quite perky. (A ZIF socket supports updating to a DX2 or P24T Pentium processor if you ever feel the need for a speed boost.) And in addition to being fast, this system boasts good looks. The case has an attractive molded plastic front, and the space-saver keyboard is stylish as well. More important, it has a solid feel with audible, tactile feedback. The noninterlaced ADI MicroScan 3G monitor has a crisp .28-mm dot pitch and electronic adjustment controls. The multimedia system includes a number of CD-ROMs, including a disc of shareware, an encyclopedia, an atlas, games, and a CD-audio classical music sampler.

NMC's Universal Winstation 433 exhibits a level of quality you would expect in a more expensive MPC system.

Documentation for Windows 3.1, DOS 6, the motherboard, and all the expansion cards is included, but NMC didn't stop there. There's a handy 40-page Starter Manual that will get even first-time PC owners up and running; it includes setup, troubleshooting, and technical-support information. This little booklet can make a lot of difference to the wary first-time computer owner; too many companies just toss in the manuals for the components and leave system operation as an exercise for the purchaser.

Best of all, this high quality comes at the price of a low-end clone. NMC provides unlimited toll-free technical support, a one-year warranty on parts, and a two-year warranty on labor. If you're looking for a solid multimedia system at a discount price, I'd suggest you take a close look at NMC's impressive offering.

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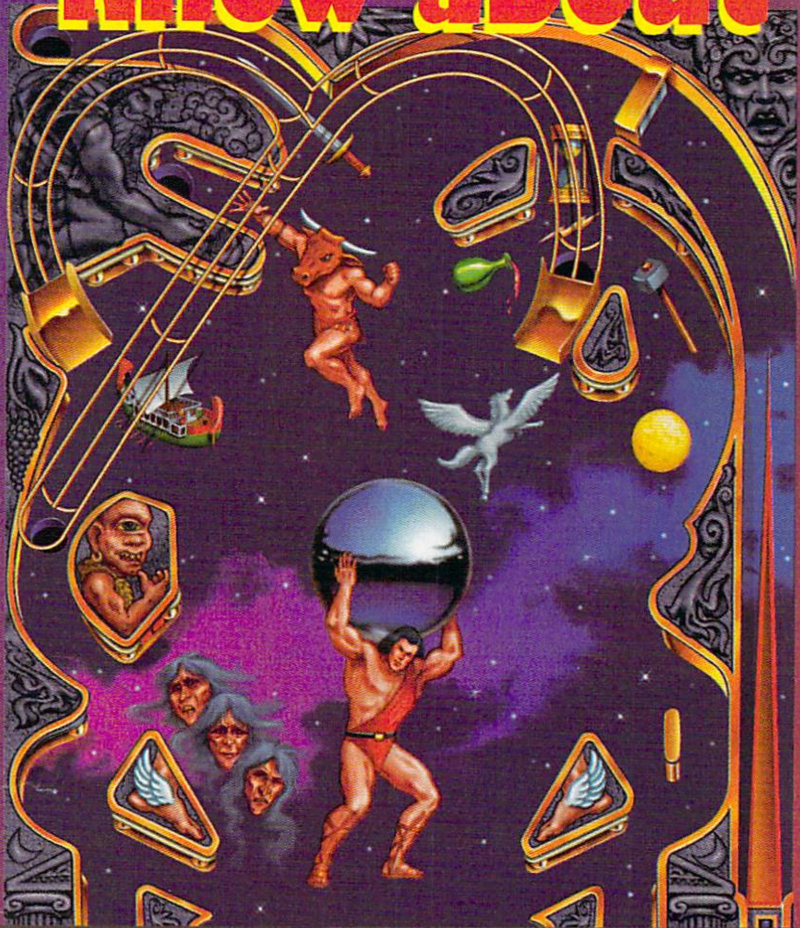
MICROSOFT WORD 6.0, WORDPERFECT 6.0 FOR DOS

The latest releases of WordPerfect and Microsoft Word are proof that powerful DOS word processing isn't dead. Both programs incorporate features previously found only in Windows applications while retaining the speed of DOS text mode.

The two programs have several similar new features such as drag-and-drop text editing, built-in support for graphic fonts, and optional control bars. Both programs are shipped with dedicated versions of the Grammatik grammar checker.

But despite surface similarities, Microsoft Word for MS-DOS 6.0 and WordPerfect 6.0 for DOS aren't as comparable as their predecessors were; they each suit very different needs. For example, if you're using a 286 with a 40MB drive, then Word may be the better choice. The program takes less than 6MB for a full installation, requires only 384K of RAM, and minimally taxes your processor. On the other hand, if you

Forget everything you know about pinball.



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Actual game screens may vary

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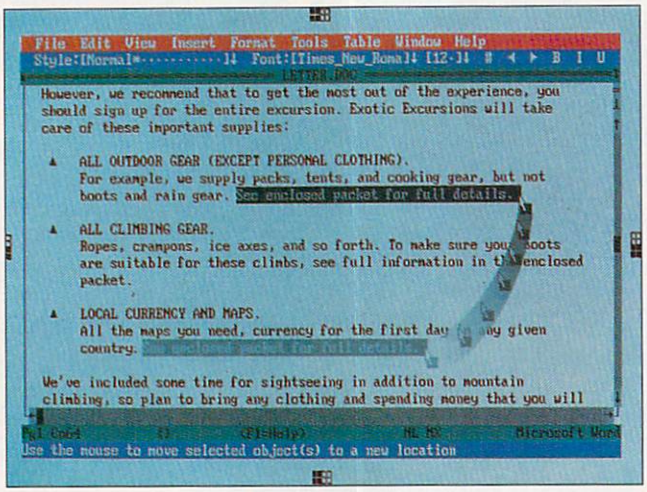
have a fast 386 or better, at least 520K of RAM, and can afford 16MB of hard disk space, WordPerfect is a considerably more flexible program, with impressive spreadsheet, fax, sound, presentation, and desktop publishing capabilities.

WordPerfect 6.0 offers the best of versions 5.1 for DOS and 5.2 for Windows and adds several new features of its own. You can wrap text around irregular graphics, print postal bar codes for bulk mail, and open up to nine documents. This last enhancement was long overdue, and while it's still limited compared to Word—in which you're limited only by available memory—it beats the old two-document limit.

The program lets you switch between text mode and a Windows-like graphical interface at any time. You can compose and edit with the speed of text mode and then switch to VGA graphic mode to place your pictures and make your other layout decisions. The graphic mode, however, is sluggish compared to Windows applications. Screen redraws can be painfully slow when you're using pictures or soft fonts in your document, even on a 33-MHz 486DX with 8MB of memory.

Word 6.0 is a capable DOS program that offers you many (but not all) of the features of Word for Windows 2.0. Its table-creating tool and TrueType fonts are Windows carryovers, as are drag-and-drop editing and automatic bulleting. The program is probably intended to prepare DOS users for the eventual switch to Windows. If you own a 286 or slow 386 but plan to upgrade to faster equipment in the future, you can buy Word 6.0 now and upgrade later to Word for Windows 6.0 (Microsoft skipped from 2.0 to 6.0 to bring the version numbers in line) for free under Microsoft's dual-license agreement.


File Edit View Insert Format Tools Table Window Help
Style:[Normal*···········]↓ Font:[Times_New_Roma]↓ [12·]↓ B I U
LETTER.DOC

However, we recommend that to get the most out of the experience, you should sign up for the entire excursion. Exotic Excursions will take care of these important supplies:

▲ ALL OUTDOOR GEAR (EXCEPT PERSONAL CLOTHING).
For example, we supply packs, tents, and cooking gear, but not boots and rain gear. See enclosed packet for full details.

▲ ALL CLIMBING GEAR.
Ropes, crampons, ice axes, and so forth. To make sure your boots are suitable for these climbs, see full information in the enclosed packet.

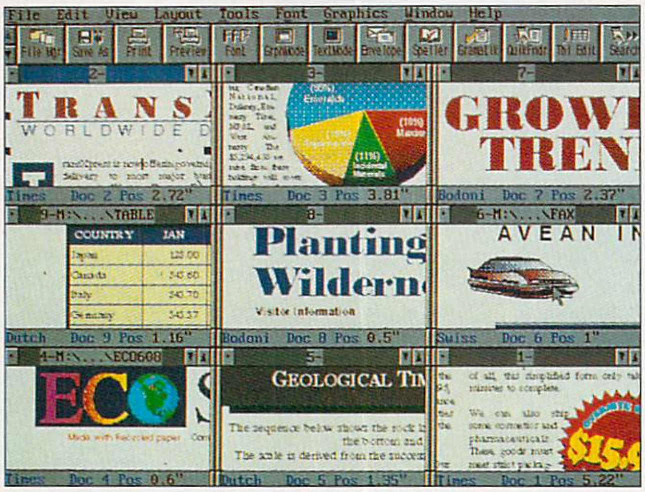
▲ LOCAL CURRENCY AND MAPS.
All the maps you need, currency for the first day in any given country.

We've included some time for sightseeing in addition to mountain climbing, so plan to bring any clothing and spending money that you will

Pg1 Co64
<F1=Help>
Microsoft Word

Use the mouse to move selected object(s) to a new location

Among Microsoft Word 6.0's new features is drag-and-drop, which was brought over from its Windows counterpart.


File Edit View Layout Tools Font Graphics Window Help
File Mgr
Save As
Print
Preview
Font
GrphMode
TextMode
Envelope
Speller
Grmatik
QuikFndr
Tbl Edit
Search
TRANS
WORLDWIDE
Times Doc 2 Pos 2.72"
Times Doc 3 Pos 3.81"
GROWT
TREN
Bodoni Doc 7 Pos 2.37"
9-M:\...\TABLE
COUNTRY
JAN
8-
Planting
Wildern
Visitor information
6-M:\...\FAX
AVEAN IN
Dutch Doc 9 Pos 1.16"
Bodoni Doc 8 Pos 0.5"
Swiss Doc 6 Pos 1"
4-M:\...\ECO608
ECO
GEOLOGICAL TI
$15.
Times Doc 4 Pos 0.6"
Dutch Doc 5 Pos 1.35"
Times Doc 1 Pos 5.22"

WordPerfect 6.0 for DOS sports a Windows-like interface and the ability to open up to nine documents at once.

One of the most significant improvements to both Word and WordPerfect is the built-in capability to handle graphic soft fonts. Both support scalable TrueType fonts; WordPerfect also supports Type 1, CG Intellifont, and Bitstream Speedo fonts. To prevent printer files from becoming too large, Microsoft suggests that you not install more than 5 new fonts at a time and no more than 20 total. WordPerfect's documentation mentions no such limitation.

Unfortunately, "deep architectural problems" prevent Word 6.0 from printing TrueType fonts as text on the popular Hewlett-Packard DeskJet printer. This problem doesn't exist with other ink-jet printers, and Microsoft says third-party software is available which will allow you to print TrueType as well as other graphic fonts on your DeskJet.

Like WordPerfect, Word allows you to switch between text and graphic modes on the fly. However, there's a big difference between what each program calls graphic. Word can give you bold, underline, and italic screen fonts as well as a preview of special characters, but it's not comparable to WordPerfect's WYSIWYG.

Depending on your word processing needs and hardware, the choice between the latest versions of Word and WordPerfect should be a clear one. If you need maximum speed with minimum hardware, take a good look at Word. If you need more from your word processor than just word processing and have the computing power to back it up, WordPerfect has versatility to spare.

PHILLIP MORGAN

WordPerfect
(800) 451-5151
(801) 225-5000
WordPerfect 6.0 for DOS—$495
$129 (upgrade)

Circle Reader Service Number 286

Microsoft
(800) 426-9400
(206) 635-7210
Word 6.0—$495
$129 (upgrade)

Circle Reader Service Number 287

DAY OF THE TENTACLE

One's purple, mean, and rubbery; the other's pale, dweebish, and scrawny. Rush Limbaugh and Ross Perot? No, it's the Purple Tentacle and Bernard, stars of LucasArts' magnificent Day of the Tentacle, a B-movie

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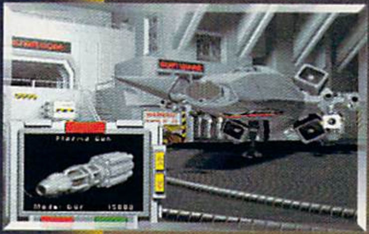

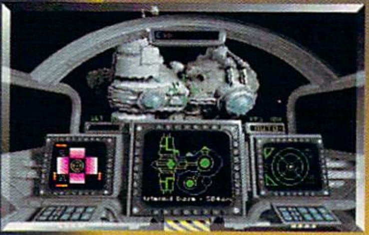

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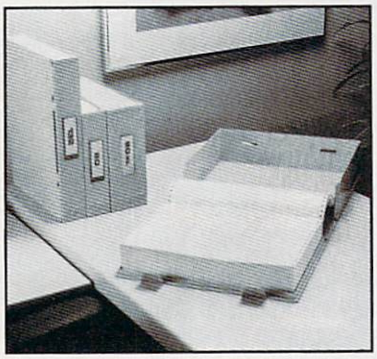

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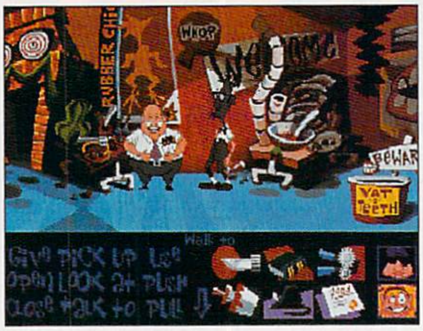
Circle Reader Service Number 213

sci-fi parody that skirts the lunatic fringe of comedy adventure.

Officially, the game is a sequel to 1987's Maniac Mansion, but it bears little resemblance to that archaic masterpiece, noted for the debut of LucasArts' SCUMM story system. Graphics, sound, and storage devices have improved significantly over the past six years. As if to dramatically illustrate exactly how far we've come, the complete Maniac Mansion—CGA graphics and PC speaker sounds intact—is cleverly hidden within Day of the Tentacle. Whether or not you're familiar with the original, it's a delightful spin down memory lane. Be warned, however: The experience is like falling through a primordial portal of computer gaming. The story remains as clever as ever, but the presentation will make your VGA-loving skin crawl.



Day of the Tentacle is a sequel to the first SCUMM adventure, Maniac Mansion.

Beyond some well-deserved backslapping, the inclusion of Maniac Mansion actually fits in with the sequel's wacky premise of time travel. An all-talkie introduction sets the stage: Green and Purple Tentacle, out for a stroll, stumble upon toxic waste discharged from Dr. Fred Edison's secret laboratory. Despite Green's warnings, Purple takes a gulp and is soon transformed into a highly intelligent, superaggressive appendage, intent on taking over the world.

To prevent further damage, Dr. Fred enlists the help of three kids: Bernard, a well-meaning computer geek; Hoagie, a heavy-metal roadie; and Laverne, a slightly off-center med student and freelance surgeon. The plan is to travel back in time, one day before Purple Tentacle become infected. Unfortunately, Dr. Fred's time machines—retrofitted portable outhouses, called Chron-o-Johns—misfire, zapping our three misadventurers in opposite directions in space and time. Hoagie lands in the era of Benjamin Franklin, while Laverne travels to a future twisted by the evil Purple Tentacle. Only Bernard returns intact, where he must coordinate joint efforts by his distant friends to halt the Purple threat.

From here, the story takes off into three disparate, but interrelated, sections. Once a link in time is established, you can switch control to each character as needed. The mouse-driven SCUMM interface, refined in the Monkey Island and Indiana Jones series, remains one of the genre's most intuitive and friendly. Puzzles are object-oriented and relatively nonlinear in nature. Most are of intermediate difficulty, requiring simple manipulation of collected items. The fun part, of course, is simply exploring odd locations and engaging in outrageously funny conversations. Multiple games can be saved and restored for convenience sake. You may get stumped, but unlike other adventures, there's no punishment for wrong actions.

Except for a few short transitional scenes, disk-based users will find the digitized speech ends after the prologue. The CD-ROM version, however, features talking characters throughout. While both versions are identical and equally enjoyable, the full-throated CD edition—containing more than 268MB of sound—is simply fantastic. Professional actors contribute to the success, especially the inspired casting of Richard Sanders, best known as Les Nessman on the TV sitcom *WKRP in Cincinnati,* as Bernard.

Graphics and animation are also excellent, inspired by the Chuck Jones era of Warner Brothers cartoons. Of particular interest is the hilarious opening credit sequence, good enough to sit through several times. Lead artist Peter Chan imparts a wonderfully inventive, almost surreal edge to his wildly exaggerated graphic styling.

Terrific fun from start to finish, Day of the Tentacle is one tongue-in-cheek adventure you'll wish would never end.

SCOTT A. MAY

LucasArts
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$69.95 (CD-ROM)

Circle Reader Service Number 288

SMART ONE 1442FX

Best Data Products' Smart One 1442FX is an external high-speed fax/data modem that's a real bargain. Based on the popular Rockwell modem chip set, the 1442FX provides 14,400-bps transfers in both fax and data mode. It supports all of the popular error correction and data compression modes, such as V.32bis and CCITT

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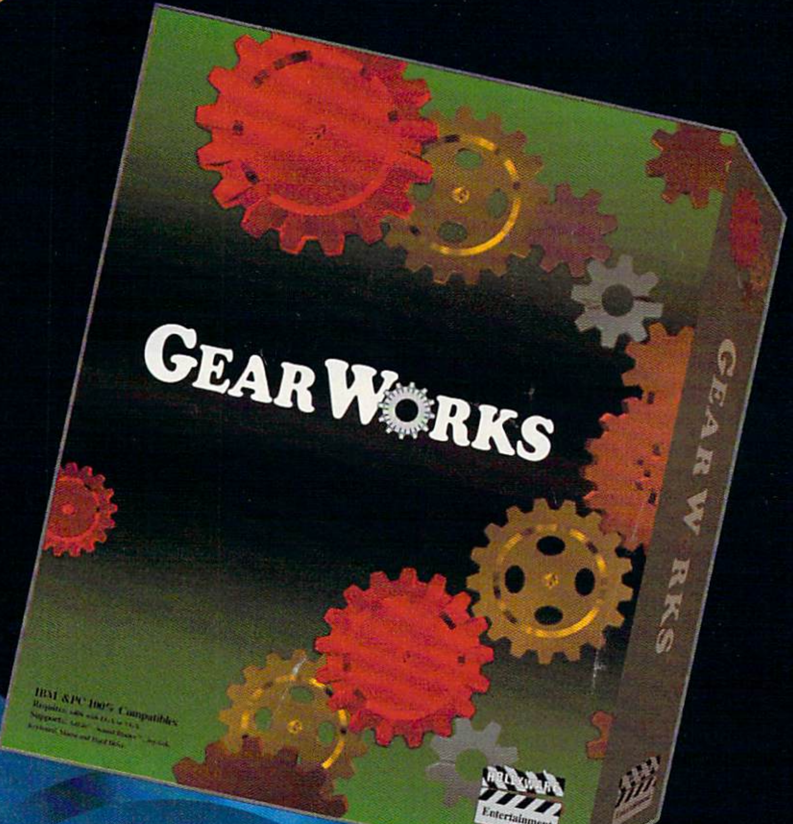

Gear Works is the most unique puzzle game to hit the market in years. In Gear Works you will connect gears of various sizes and colors together in order to transform Twelve Wonders of the Ancient and Modern world into time pieces, while racing against time and friction. Watch out for the Pottins, two gremlin like creatures, that will torment you by rusting the gears and breaking off the mounting pegs.

Game features: Various gear types, over one hundred puzzles to solve, bombs to blow up incorrectly placed gears and a gun to shoot those pesky Pottins off the play area.

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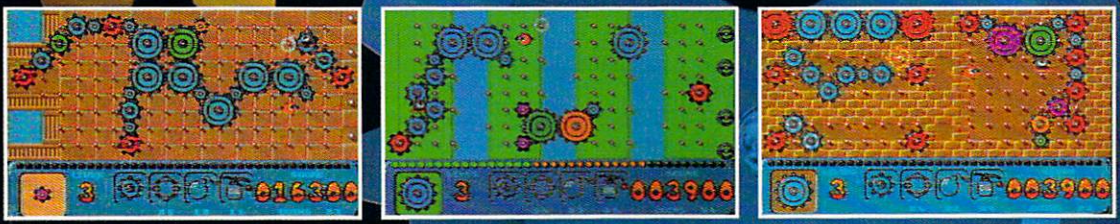

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V.17 fax protocol. Connected to a similar modem, the 1442FX can manage transfers of up to 57,600 bps when transferring raw text with compression active. Such speed leaves those of us who remember 300-bps modems almost short of breath.

The sturdy white plastic case is of the "sit under the phone" variety. It sports eight status lights on the front, but unfortunately, the power switch is on the back along with the DB-25 serial connector, power connector, and two phone jacks. At just under two pounds with power connector, it's light enough to pack along with your laptop (and it's much less expensive than battery-powered pocket modems of similar capability). Best Data also sells a less expensive internal version, but the ease of transferring an external modem to another computer and the reassurance of the front-panel status lights make the external model a more attractive choice.

The 1442FX is a solid performer. Many 14,400-bps modems are more finicky about connecting to other brands than the older 2400-bps models, but I had no trouble connecting to many modems ranging in speed from 1200 bps to 14,400 bps. Fax connections were handled flawlessly as well.

The modem I reviewed included the DOS-based QuickLink II fax/data package. Best Data recently announced the Gold Bundle, which includes the 1442FX, a CompuServe introductory membership kit, and the WinCIM terminal program; you may find other bundles at your local retailer as well. Although the modem retails for $329, it can be found for well under $200 at discount retailers. At that price, can you afford not to upgrade to 14,400-bps speed?

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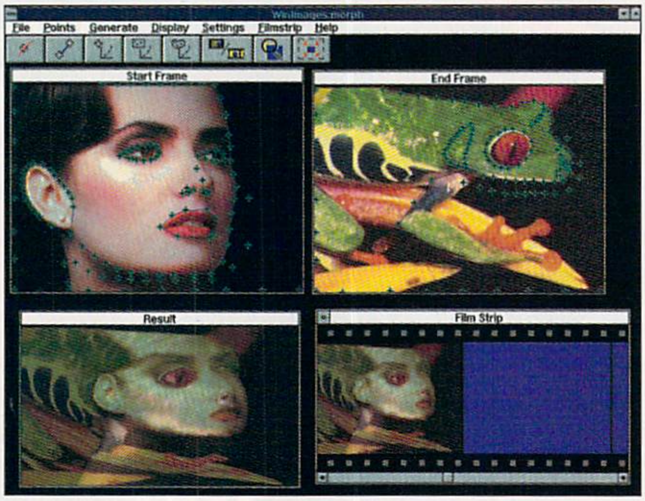

WinImages:morph gives you the power to create impressive transition-morph animations between pictures.

WINIMAGES: MORPH

Did you feel a thrill when T1000 oozed through the bars in *Terminator 2?* Did you record Michael Jackson's "Black or White" video so you could play it for yourself in even heavier rotation? Do you watch "Star Trek: Deep Space Nine" just to see Odo reconstitute himself from a chair or a wine bottle? If so, you're a nut for morphing, the latest fad in computer graphics special effects with, as far as is known, no practical use other than to create startling eye candy.

Morphing comes in two flavors. Transition morphing is the process of smoothly combining two images into a third that has some of the characteristics of both. Distortion morphing takes an image and radically distorts it to create something weird. For example, if you transition-morph pictures of a lady and a tiger, you get a new image of a tiger-woman. Or you can distortion-morph a face to give it a Klingon forehead, a Pinocchio nose, Ferengi ears, and other bizarre features.

WinImages:morph does both kinds of morphs, and it does them well. This is a program for the true morph enthusiast. You can create single or multiple images in a single distortion-morph operation, precisely controlling which parts of each image will morph together. Distortion morphs are completely free-form, with precise boundary control. WinImages:morph reads most kinds of graphics files and creates animation sequences in full 24-bit color in AutoDesk FLI format. You can even break up an animation rendering and distribute it over many PCs—a useful feature, since a 24-bit, 30-frame morph animation can take hours to render on even a fast 486. You'll need 4MB of RAM to run the program, but Black Belt recommends 8MB of memory for optimal performance.

WinImages:morph is even easy to use, once you've grasped the basic concepts. (The online manual isn't great, but you'll be able to figure out most features with a little experimentation.) The real skill is in knowing how to choose control points and define boundaries for the best morph effects. You'll gain that skill only through experience. I recommend working with 256-color, single-image output before trying your hand at animation.

One caveat: As a slick special effect, morphing was hot two years ago. Today, even though morphing is new to the PC, people may not be impressed. You'll have to come up with something really spectacular to evoke the same awe *Terminator 2* did back in 1991. But WinImages:morph certainly gives you the tools and the power to do it.

STEVEN ANZOVIN

Black Belt Systems
(800) 852-6442
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ROCK AND BACH STUDIO

Kids love music videos, but watching videos is a passive activity. Why not encourage them to exercise their creativity by using Rock and Bach Studio to create their own videos with dazzling special effects?

Targeted at kids between ages 7 and 14, Rock and Bach Studio lets them explore the world of music by

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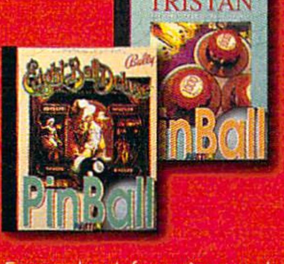

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composing songs, creating music videos, and experimenting with rhythm and harmony. Accompanied by Edison, their computer companion, your children look, listen, and create as they browse through each room of the studio.

Fluorescent colors flash across your PC's monitor as Rock and Bach Studio's musicians demonstrate rhythms, instruments, and dance moves. Each screen displays options with both words and pictures, allowing children to wander through the program without assistance. The text is casual and friendly in style, so that even a young reader won't feel intimidated.

Kids will encounter a variety of ensembles, ranging from jazz and Latin combos to rock groups to full orchestral sound. Each room in Rock and Bach Studio provides a new musical experience. In The Drum Clinic, children can bang out their own rhythms on their keyboards as they experiment with an assortment of drums, cymbals, and gongs. In The Instrument Room, children discover the history of traditional instruments and the instruments' orchestral value.

Leaping from the traditional to the ultramodern, children can experiment with digitized sound in The Sound Effects Room. As they watch the sound's graphic form, your kids can create their own effects using echo, reverberation, and sound filters.

In The Music Room, Rock and Bach Studio uses humor to show that classical music can be interesting. Children learn that Mozart, "the original rock star," began touring Europe at age 7 and that Debussy created the "original New Age music." Children can also listen to classics by such famous composers as Brahms, Beethoven, and John Philip Sousa.

Once your kids feel comfortable with the fundamentals, they can use this knowledge and their imagination to create a music video. First, they must compose their own song using sections of prerecorded melodies. After mixing their favorite riffs, children can audition musicians to form the band. Then they move to video production to coordinate camera angles, backgrounds, and special effects to complement their music. After they've finished, children can watch their video with Edison or copy it to a disk to share with a friend (the video can be saved in a stand-alone format so your friend doesn't have to own a copy of Rock and Bach Studio to play it).

LISA YOUNG

Brøderbund
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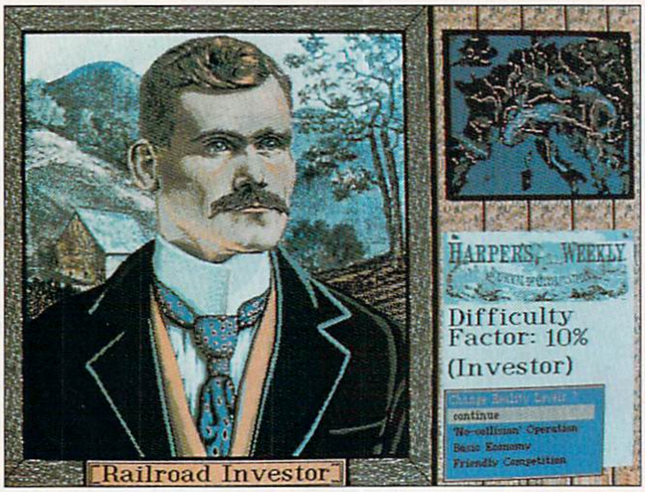
Circle Reader Service Number 291

RAILROAD TYCOON DELUXE, PIRATES! GOLD

MicroProse has taken two classic Sid Meier games, Railroad Tycoon and Pirates!, and updated them for today's PCs. Although the originals still stand as two of the most playable games in the company's history, the Super VGA graphics and more-detailed playing environments of Railroad Tycoon Deluxe and Pirates! Gold make great games even better.



Railroad Tycoon Deluxe updates the classic simulation to include SVGA graphics and more locations for your railroad.

Railroad Tycoon Deluxe is a game of railroad development: You build a rail line from the ground up. You've got to balance economic and logistic considerations while trying to make a large, profitable enterprise grow.

The depth of the economic model and the omnipresent competition from other rail lines make Railroad Tycoon Deluxe an exciting, interesting game that's likely to hold your attention for many hours. You must lay track prudently, build stations, buy locomotives, and set up schedules which will meet the necessary supply-and-demand requirements of your stations.

Railroad Tycoon Deluxe improves the depth of the economic model (taking into account such things as drastically falling stock prices) and adds several new locations which give you an opportunity to explore not only North America and Europe, but South America and Africa as well.

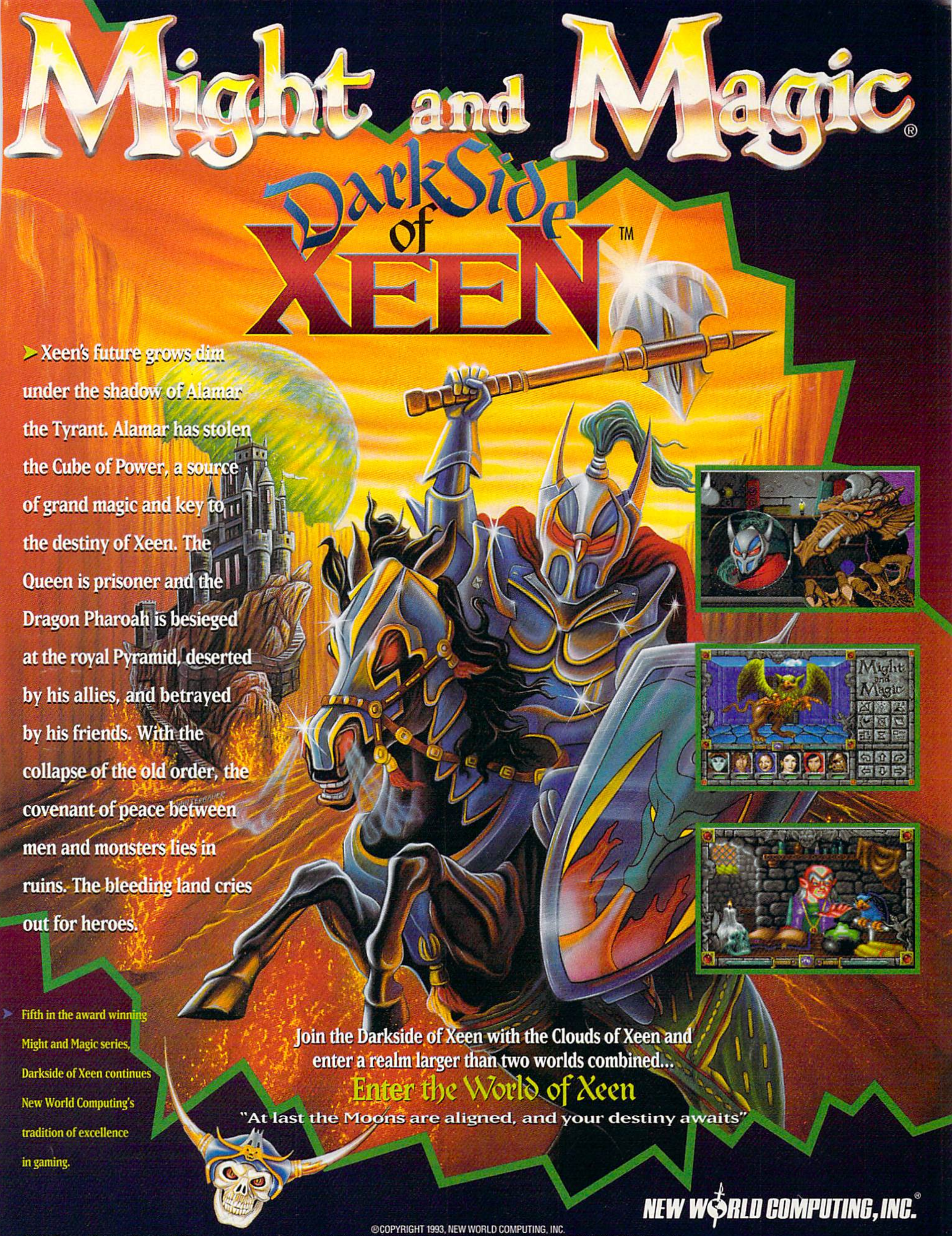
Unfortunately, the game shows indications that it was rushed into release before some problems were ironed out. It locks up occasionally, and has more than the average share of sound card addressing conflicts. On the map screen, the viewing area sometimes jumps too far away from your mouse clicks. The manual spends an entire chapter taking you through a detailed tutorial railroad which is missing from the Deluxe version's disks. The screen prompts were sloppily done in places, and the copy protection (identifying a locomotive from a picture) presented me with a train which wasn't mentioned in either the manual or the technical supplement.

Railroad Tycoon Deluxe basically puts a pretty face on an otherwise solid game. As far as play goes, the bugs of the new version balance out the enhancements. If you already own Railroad Tycoon, it might not be worth the money to upgrade. But if you never played the original, this is one rail line you'll want to hop aboard.

Pirates! Gold is truly a visual feast, with hand-painted screens that have the feel of Caribbean watercolors. It's off to the seas in a small sloop to seek fame, fortune,

Might and Magic®

DarkSide of XEEN™



Xeen's future grows dim under the shadow of Alamar the Tyrant. Alamar has stolen the Cube of Power, a source of grand magic and key to the destiny of Xeen. The Queen is prisoner and the Dragon Pharoah is besieged at the royal Pyramid, deserted by his allies, and betrayed by his friends. With the collapse of the old order, the covenant of peace between men and monsters lies in ruins. The bleeding land cries out for heroes.

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and many, many dueling scars. Pirates! Gold features three main arenas of action: sword fighting, ocean-faring battles, and land battles. These are connected by a role-playing shell which allows you to court the favor of local politicos, woo beautiful women, and recruit salty dogs in the local pub.

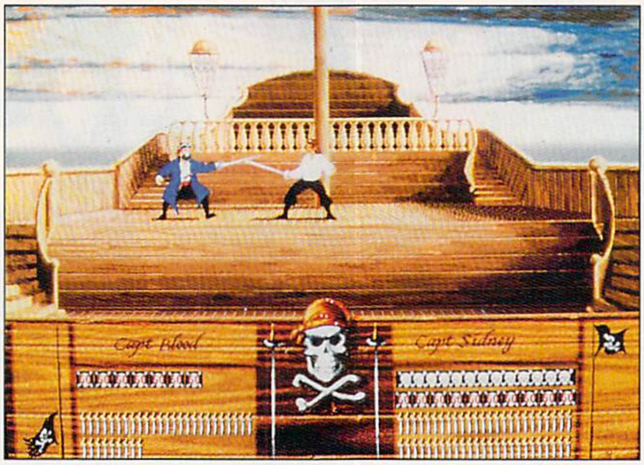
All in all, Pirates! Gold is as addicting a game as you're likely to find. It doesn't take weeks to learn, and it provides hours of fun. In the fencing sequence, you'll find yourself lunging, parrying, and slashing in a duel with an opponent. At first it seems like an exercise in key bashing, but after several duels the madness gives way to method, and you'll discover that there are times when a parry can save your hide and set you up for a low lunge sure to score.

The seafaring battles are a marvel of simplicity. You steer the ship and fire the cannon at your enemy. There are a number of factors to take into account, though, such as the direction of the wind, the fullness of the sails, the cannon reload rates, and the speed of a particular ship. Once an enemy ship has been softened up, you can sail broadside and grapple her, raiding the deck and battling the enemy captain. If you're victorious, you can plunder the ship, then keep the ship or scuttle it.

Pirates! Gold, like Railroad Tycoon Deluxe, does have some problems. For all the beauty of the interaction screens, there isn't much variety (towns of different nationalities should look different). There's no easy way to restore a game (you must exit the game entirely to restart a saved game), and you can't save a game unless you're in port. Finally, some of the logistical interfaces are a bit clumsy; there's no easy way to switch your command to a newly captured ship until you face combat.

However, Pirates! Gold is a more spectacular upgrade than Railroad Tycoon Deluxe: even if you already own the original Pirates!, this new version is certainly worth looking into. In all, both of these games are essential additions to any serious gamer's library.

PAUL C. SCHUYTEMA



Pirates! Gold takes the CGA classic into the Super VGA realm, adding beautiful hand-painted graphics.

MicroProse
(800) 879-7529
Railroad Tycoon Deluxe—$69.95

Circle Reader Service Number 292

Pirates! Gold—$69.95

Circle Reader Service Number 293

ARES 486-33DX

The first thing you'll notice about the ARES 486-33DX midtower PC is that it's a very attractive unit, with a smoked-plastic front panel covering the turbo, reset, and power buttons, as well as a bright green LED display which shows the adjustable microprocessor speed. But it's not just a pretty face—it's a solid performer backed by excellent product support.

The standard configuration, which I reviewed, has a 33-MHz i486DX, 4MB of memory, a 170MB Quantum hard drive, a 16-bit IDE controller, dual floppy drives, a 256K external cache, a three-button mouse, a Flash 101 programmable keyboard, a low-radiation SVGA monitor, and a VLB SpeedStar Pro graphics card. Windows 3.1 and MS-DOS 6 are not only included on the hard drive but supplied on disk as well.

ARES provides everything you need to get up and running—and *stay* running. Along with ample documentation, complete with technical specifications of all components, ARES supplies a system inspection checklist, a CMOS configuration checklist, a printout of the factory diagnostic results, and a lifetime membership card for 24-hour technical support. One unusual service supplied by ARES is remote diagnostics of your system. You can simply use your modem and the supplied QA Plus software to call the ARES host computer and let the service techs take over and find out exactly what's wrong with your computer.

ARES uses a Micronics MX30 VESA local-bus motherboard, which has a 238-pin ZIF socket for upgrading to a DX2, OverDrive, or P24T Pentium processor. Two 32-bit VL-bus slots and six 16-bit ISA slots provide ample expansion capability. The well-built 19-inch-high midtower case provides easy access to all the system components and card slots.

ARES provides a two-year parts warranty and a lifetime labor warranty with all its systems. With that and the company's remote diagnostics, 24-hour support, and 60-day money-back guarantee, the ARES 486-33DX is a strongly backed, quality system that you can feel secure in buying.

BRUCE M. BOWDEN

ARES
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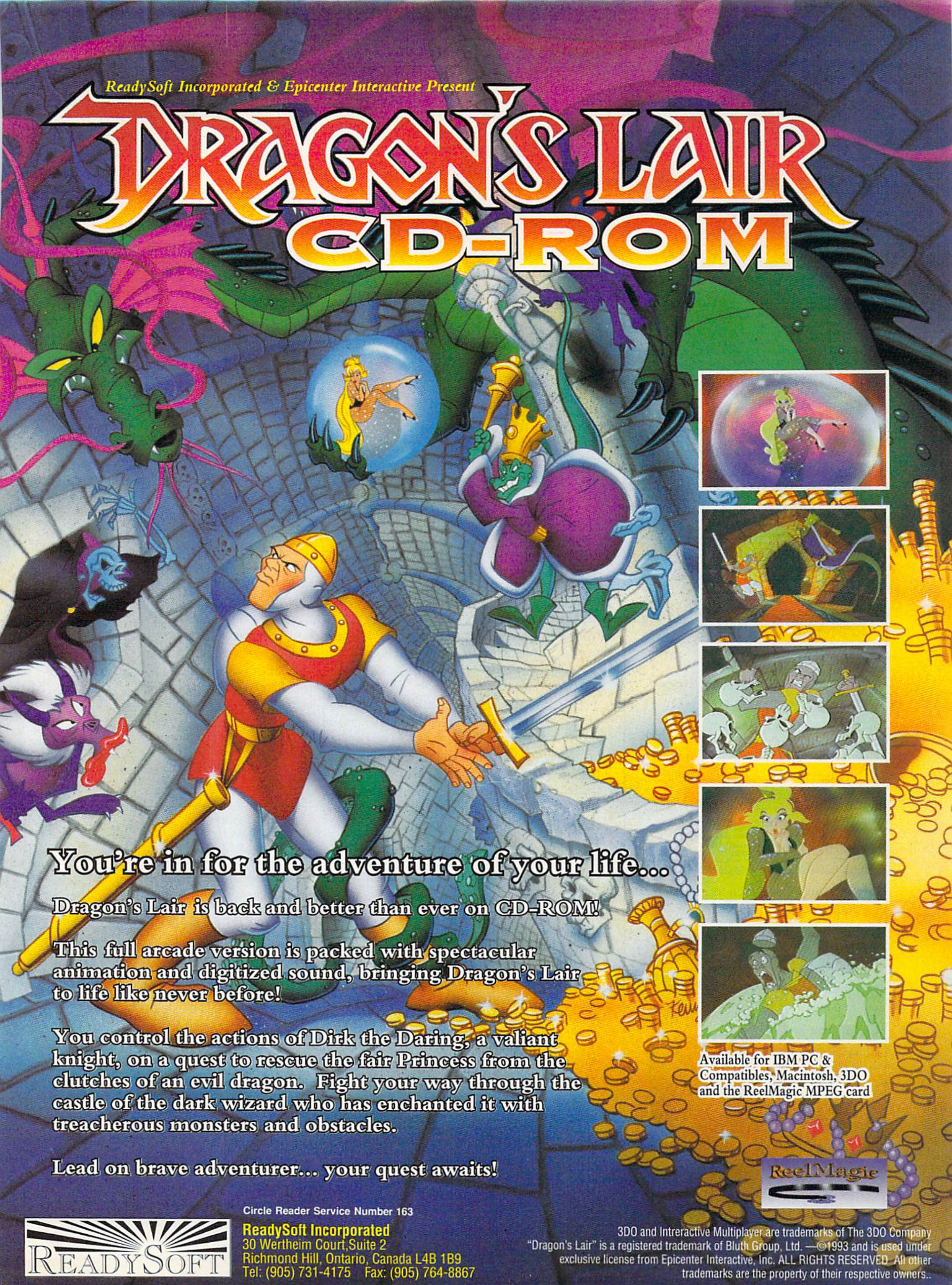
GRAND SLAM BRIDGE II, MICRO BRIDGE COMPANION

I love to play bridge, but sometimes it's hard to find the three other people you need to play the game. With Grand Slam Bridge II or Micro Bridge Companion, you can play anytime your heart desires.

These games take different approaches to simulating the classic card game. Grand Slam is very graphi-



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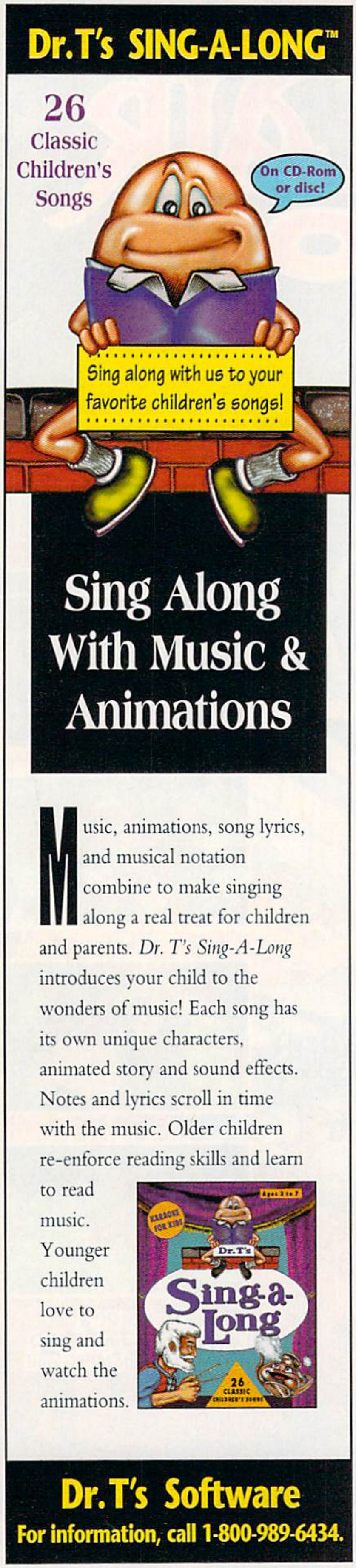

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cal and includes sound card support, but it plays only an intermediate-level game. Micro Bridge Companion skips most of the graphics and sound but plays like a bridge expert.

Bridge presents a unique challenge to the computer programmer. Most computer chess games give even good players a challenge; most good bridge players can trounce computer bridge games. Chess deals with straightforward logic, in which standard artificial intelligence techniques excel. Bridge has the added dimensions of probability and statistics (because you're unable to see all the cards).

If you're a competent bridge player, you'll beat Grand Slam more times than not. You'll need to be much better to beat Micro Bridge Companion at the same rate. I had a bit of difficulty evaluating the games' playing strengths during contract bridge matches. The luck of the deal has a lot to do with the final score. It's easy to get carried away with your brilliance after getting several consecutive good hands.

Micro Bridge Companion supports duplicate bridge, and you can pit yourself directly against the computer. I barely managed to keep parity with the computer during duplicate play and succeeded only when I really worked hard.

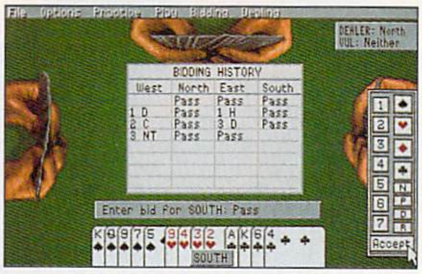
Besides the usual openings and responses in typical situations, both programs offer a variety of bidding conventions. Weak two-bids and special notrump bids are among the choices offered. Both programs play using the Stayman convention, but this was only evident in Grand Slam after playing several hands that called for this convention. Its manual, unlike Micro Bridge Companion's, didn't mention this feature explicitly.

Missing from Grand Slam's bidding are the Blackwood and Gerber conventions. These are always present in Micro Bridge Companion's play; in fact, the programmers thought them so important that they can't be turned off, even from the conventions menu. It's almost impossible to bid a slam without these conventions. This is an especially haunting omission that detracts from Grand Slam's playability.

Both games let you load and save deals, so that you can play an especially interesting hand again later, show it to a friend, or challenge someone else to do better than you at playing it.

In either game, you can choose who gets the best hands—either you, your team, or your opponents. Grand Slam will also let you select the deal type, such as slam, game, no-trump, or a part-score hand. These options let you tailor the games to give you the particular kind of practice you need.

One valuable bonus included with Micro Bridge Companion is a set of 24 deals drawn from *The Bridge World* magazine and designed by Alfred Sheinwold. They're intended to challenge even experienced players, and each of the deals tests and illustrates a different concept.



DEALER: North
VUL: Neither

BIDDING HISTORY

West	North	East	South
	Pass	Pass	Pass
1 D	Pass	1 H	Pass
2 C	Pass	3 D	Pass
3 NT	Pass	Pass	

Enter bid for SOUTH: Pass

Grand Slam Bridge II has a graphic edge, but plays an intermediate-level game.

If you like bridge, you'll definitely want to get one of these games. Even if you prefer to play with real people, these games will help keep you in practice. My wife and I use these games to develop our strategy before matches, and they help tremendously. Practicing with these programs may not only help improve your game, but it may also reduce the number of glares you get from your partner.

RICHARD C. LEINECKER

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MEDLEY PLUS

The Medley Plus multimedia bundle from Cell Micro brings MPC compatibility to your PC in an inexpensive, easy-to-install package. It consists of a sound card, a CD-ROM drive, stereo speakers, and necessary cables. Also included is a starter CD-ROM library consisting of the Toolworks Multimedia Encyclopedia, World Atlas, U.S. Atlas, and Game Pack II.

A small but complete manual guides you through installation. I was able to install the sound card, CD-ROM drive, and all the software in less than an hour. Included on floppy are sound-editing and -digitizing programs, CD-ROM control software, and all the drivers for the CD-ROM and sound card.

The sound board is compatible with Ad Lib, Sound Blaster Pro II, COVOX, and Disney Sound Source drivers. It has an OPL3 FM stereo synthesizer, which generates 20 voices. The board can produce and play back stereo sounds from four sources at sampling rates ranging from 4 to 44.1 kHz, and it's equipped with an automatic stereo recording level control. You can output to an external amplifier or use the onboard four-watt amplifier, which accommodates two speakers. The CD-ROM drive attaches to a 16-bit interface on the sound card and has a fast 265-ms access time, with a double-speed transfer rate of 300K per second.

Cell Micro gives free phone support during the one-year warranty period.

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Cell Micro
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XTREE FOR WINDOWS 1.5

Why bother with another Windows file and program manager? Doesn't Windows do it all? Well, no. XTree for Windows adds more, while making many operations simpler. The package actually consists of three programs: XTree (the file manager, viewer, and archiver), XTree Command Center (the program manager and macro recorder/language), and XTreeLink (the disk-drive sharing utility).

XTree's file viewer and AutoView window are very useful. They display most word processor, graphic, spreadsheet, and database files without having to launch the original applications, which makes browsing your hard drive much faster and easier.

Double-click on a ZIP (archive) file, and it becomes a volume (like an additional drive) in your directory tree. You'll see the ZIP directory, and you can view each file. XTree handles extracting and compressing transparently. I initially had troubles viewing files in the new ZIP 2 format, but a patch available in XTree's vendor support area on CompuServe solved that problem.

XTree Command Center could be the solution for cluttered Windows desktops. Instead of group windows, you create CommandBars. These are like keypads of buttons (icons and/or text) that you click to launch. You can start Command Center when you load Windows or even replace Program Manager with it. CommandBars are easy to create and modify, and they save lots

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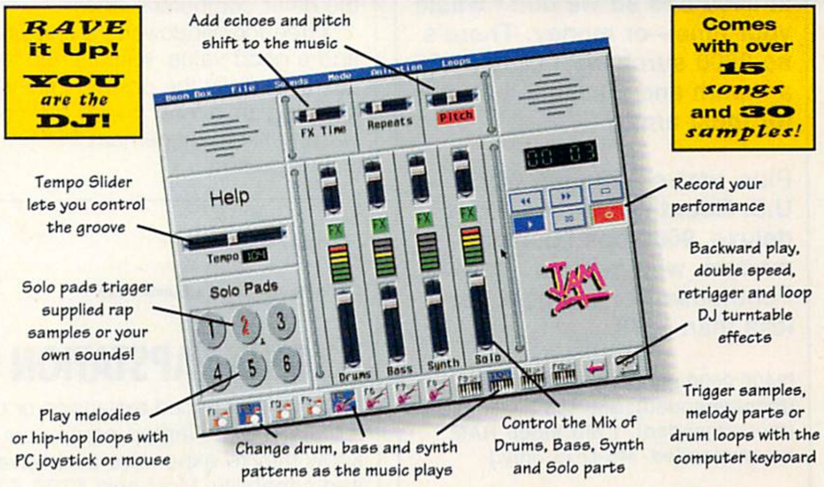

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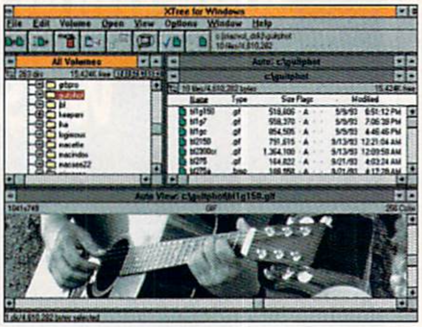
of space on the desktop. You can drag and drop a program or document from XTree onto a CommandBar to make a new button, move buttons from one CommandBar to another, or bring a button into the Event Scheduler to run macros or programs automatically. You can also have a button display other command bars and assign hot keys to buttons.



XTree for Windows has a file viewer that handles graphics as well as text.

Command Center also has a macro recorder, and you can edit and debug these macros using a macro language. The language is simple to learn and provides DDE and Network DDE support.

Finally, XTreeLINK lets you connect two PCs with a serial null-modem cable or a (faster) parallel data transfer cable. All the drives on the remote PC then can be accessed as if they were partitions on the local PC. You can transfer files from your desktop computer to your laptop, and even run programs on the other computer's drive.

XTree for Windows is a fine product and a good value. With its rich feature set, especially the powerful file viewer, this program almost makes me look forward to file management.

J. BLAKE LAMBERT

XTree
(805) 541-0604
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Circle Reader Service Number 298

AXONIX LAPSTATION IV

If you've ever priced expansion or docking stations for laptop computers, you know they're expensive and have limited capability. Most cost $700–$1,000 and only let you add two or three cards. Few let you add more than a single floppy or hard drive.

Axonix offers five expansion stations that range in price from $350–$700. The Viax is a single-slot bus adapter that weighs just two pounds and adds a ⅔-length 16-bit slot. The LapStation 1 has three full-length 16-bit expansion slots, one half-height bay, two third-height bays, and a 60-watt power supply. The LapStation II has four full-length 16-bit expansion slots, one half-height bay, and a 50-watt power supply. The LapStation III has three full-length 16-bit slots, one third-height bay, and a 40-watt power supply. And for the ultimate in laptop expansion, the LapStation IV offers five full-length 16-bit expansion slots, two half-height bays, three third-height bays, and a 150-watt power supply.

LapStations are available for most laptops with expansion connectors.

All five models can work with a variety of laptops from Toshiba (all models except the Satellite series), Texas Instruments, Compaq (all models except the Contura series), Tandy (486 series), Gateway, Sharp, PC Brand, Compudyne, Twinhead (Altima series), and many other companies. Each station is customized for your particular brand and model, so you'll need to contact Axonix for availability and price.

I tried a LapStation IV with a Toshiba T6400. It took everything I could throw at it, including a Quantum 240MB Hardcard, an 8-bit network card, a low-end MIDI card, and a VideoSpigot video capture board. The unit is quiet (much quieter than the T6400), and its tower-like case allowed me to place it right beside the T6400. Inside the LapStation IV you'll find the power cables for its five bays and adequate room to install five expansion cards (a sixth slot holds the circuitry that communicates with the computer).

It's hard to find fault with the Axonix expansion stations. With five different models and support for nearly every portable computer with an expansion connector, you can choose just the amount of expansion you need and save a bundle over the manufacturer's own expansion or docking station.

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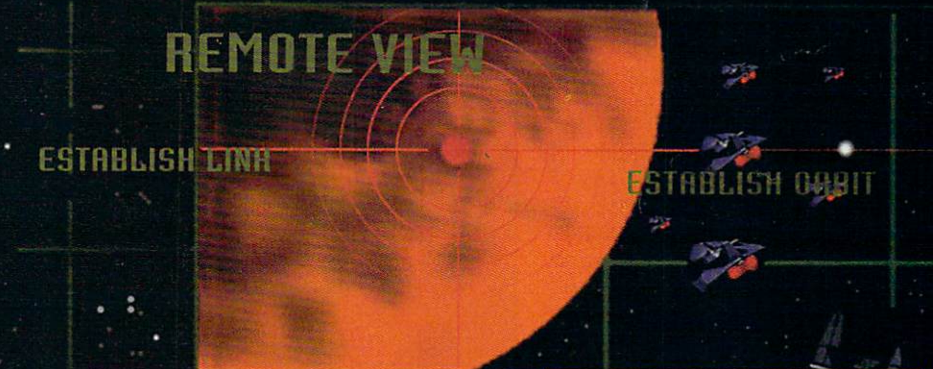
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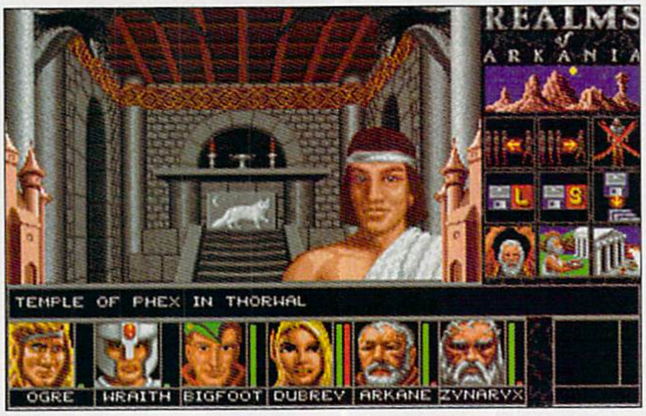
REALMS OF ARKANIA

Sir-Tech, best known for the antediluvian adventure epic Wizardry and its numerous sequels, has journeyed across the Atlantic to bring U.S. gamers Realms of Arkania, based on the German pencil-and-paper roleplaying game Das Schwarz Auge (The Black Eye).

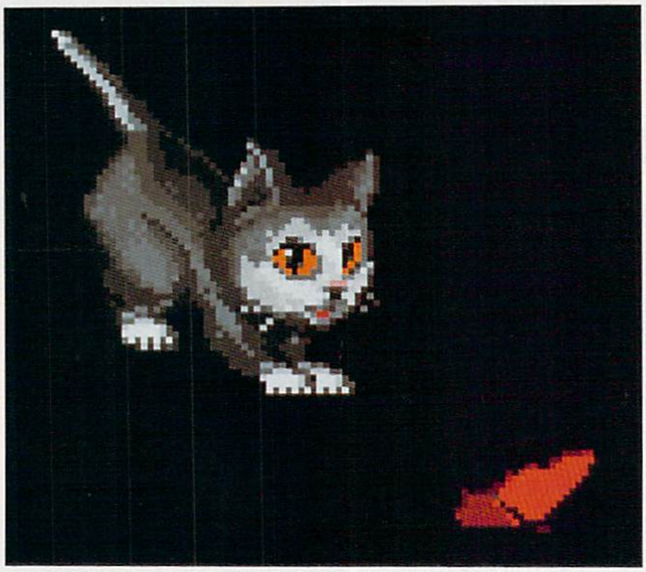
Realms of Arkania uses a typical find-the-magic-item story line to preface the action. The powerful Blade of Destiny has been lost; it must be retrieved by tracking down nine pieces of a map and journeying deep into Orc territory. Some of the map pieces are obtained simply by saying nice things to nonplayer characters (NPCs), but others are earned only after grueling quests.

The character creation process is where Realms of Arkania first and most strongly deviates from a typical adventure game. In addition to such traits as strength and dexterity, characters also suffer from a variety of negative attributes like necrophobia (not good to have when battling against undead creatures) and a violent temper (the root cause of many a dysfunctional adventuring party). If you don't want to bother with creating a party, you don't have to; several saved games with pregenerated parties are included.

Once the party has been created, the adventure begins in the small seaside town of Ragnar. After you've explored the town, talked to various NPCs, and equipped the party, it's time to start the quest proper. A large map of Arkania is displayed on the screen with red dots indicating each location. Traveling to an adjacent town is as simple as clicking the right mouse button and selecting your destination.



The characters in Realms of Arkania can have negative traits, such as short tempers and necrophobia.



More After Dark provides 25 new screen saver modules, such as butterfly-chasing Boris the kitten.

If the trip is a long one, the heroes are likely to encounter some not-so-nice creatures and enter the combat sequence. This uses a 3-D isometric perspective of the action similar to that in The Immortal, Electronic Arts' aging action-adventure game. Each character in the party has a limited number of movement points to move and attack the bad guys, making battles much more a test of brainpower than a test of reflexes. The computer can also fight the battles if you're not up to the task. The more battles you win, the more experience points you receive, and the more powerful your party will become.

The graphics in Realms of Arkania vary from sequence to sequence. The town and dungeon graphics are a bit weak, the NPC and character portraits are excellent, and the animation in the battle sequence is limited (the characters and creatures are quite small) but detailed. The sound effects are also a mixed bag; they're best during the battle sequence. And the music is nice at first, but the repetition gets annoying after a while.

The first game of a promised trilogy, Realms of Arkania has plenty of depth and will appeal to fans of Wizardry and Might and Magic (to which the game has more than a passing resemblance). Adventurers expecting the realtime action of an adventure game such as Ultima Underworld won't be as impressed.

ZACH MESTON

Sir-Tech
(315) 393-6633
$59.95

Circle Reader Service Number 300

MORE AFTER DARK

Measured in hours run, screen saver programs would have to be the most popular category of computer programs. If your screen saver is After Dark or Star Trek: The Screen Saver, you're in luck—Berkeley Systems has a terrific package of new screen saver modules for you.

The 25 modules include a man on a riding lawn mower (no matter how much he cuts, the grass keeps growing), Boris the kitten (he playfully chases a butterfly), exploding Bogglins (these strange creatures look like a cross between a dill pickle and Santa Claus), ascending washing machines and

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Circle Reader Service Number 115

refrigerators (this one's called Om Appliances), and various flocks (these include flying birds, swimming polliwogs, swarming bees, and spinning atoms).

Other modules feature Origami paper folds, dominoes, sunbursts, and fractal forests. To top it off, you get a module that's also a playable space arcade game, called Lunatic Fringe. Many of the screen savers support 256-color Super VGA displays and Windows-compatible sound cards.

If you own After Dark or Star Trek: The Screen Saver, check out More After Dark. It's a great way to liven up a dull computer.

DAVID ENGLISH

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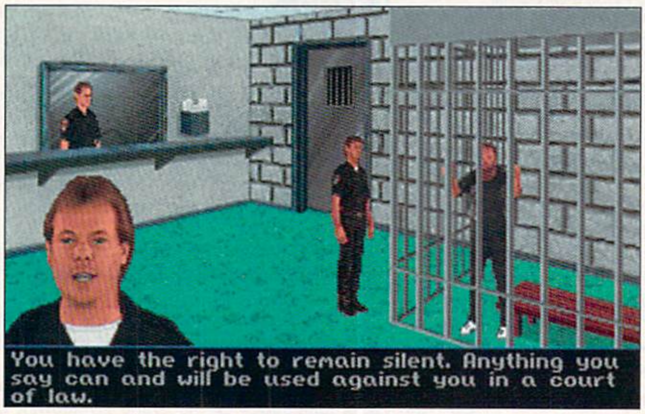
Circle Reader Service Number 301

BLUE FORCE

Blue Force, Jim Walls' new police game, represents a modest improvement over Tsunami's debut animated adventure, the grim Ringworld, but falls well short of Walls' best work on Sierra's Police Quest series.

You're a motorcycle cop in a small coastal city who's on the trail of gun smugglers—one of whom, coincidentally, is the killer of your parents. The interface (a variation on Ringworld's) is sharp and easy to use, and the sideways scrolling used on occasion is a significant improvement over the static scenes that typically accompany such games. The intercut animations are moody, and the music unobtrusive. Some sharp animated digitized images are used in the closeups for conversation. (However, the conversations are lamentably one-track.)



You have the right to remain silent. Anything you say can and will be used against you in a court of law.

Blue Force is the newest game from Jim Walls, the police officer who helped create the Police Quest series.

The problem here's the story. It's not as linear as Ringworld, but there's also not much here that doesn't bear directly on the smuggling case (aside from flirting with the bird at the jail's info desk or running Tsunami demos on the computer at home). In Police Quest, Sonny Bonds invariably had a lot to do—much of it enjoyably tied up with police procedure and not strictly related to the central quest. Here, procedure has been reduced to filing evidence, cleaning your gun, and using the appropriate radio codes.

And you don't do even that much in the second half of the game, in which you're sort of an adjunct PI who doesn't use search warrants and is allowed to throw hand grenades. (Once again, you're part of a team but have no control over its other member. And what's the point of a police game in which police don't behave like police?) Happily, there is some variety in the ending—but you may still be trying to swallow the suspect Walls springs on us. I'll let Tsunami off with a warning this time.

PETER OLAFSON

Tsunami
(209) 683-9283
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Circle Reader Service Number 302

ETERNAM

If you played Data East's Drakkhen, you'll recognize Eternam almost instantly. This two-year-old Infogrames adventure—brought over from France by Capstone—gives every evidence of being the promised sequel to that flawed but fascinating game.

To PC users, that may not sound like much of a recommendation. Drakkhen was a delightfully atmospheric game when it originally appeared on the Amiga—distinctly ahead of its time with its four independently controlled characters—but it was translated poorly to the PC.

Eternam, designed expressly for the PC, would seem to be an attempt to get it right. It preserves Drakken's basic structure: a first-person view outdoors, with a polygon ground and bitmapped scenery and monsters, and a third-person graphic adventure inside the various towns and castles you'll explore.

The obvious weaknesses in the original have been corrected. Now you can really talk to these people, and the puzzles aren't hopelessly obtuse. The landscape is now dotted with hills and has irregular shorelines—far more realistic than Drakkhen's flat rectangular slabs of terrain—and control of combat has been restored to the player.

What's missing, sadly, is the intriguing weirdness of Drakken. You never quite knew what you were going to run into out there on the darkening plain, and that added a deeply addictive effect to the game. Here that weirdness is replaced by a silly sense of humor that's more peculiar than amusing. (Remember: The French revere Jerry Lewis.)

Eternam's certainly more accessible than its predecessor. It's bigger, prettier, more playable, but, alas, it's also less compelling and more conventional. Something gained, but something lost. C'est la vie, eh?

PETER OLAFSON

Capstone
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Circle Reader Service Number 303

SJ-144

The SJ-144 printer from Star Micronics is a tough creature to categorize. Its upright configuration and the small footprint of its six-inch-deep case suggest an ink-jet or bubble-jet printer. But inside is a conventional-looking printhead and ribbon cartridge like Star's classic dot-matrix printers. The manual's "Specifications" section mentions a "heat fusion printing process," while its front page simply describes it as a laser-quality printer.

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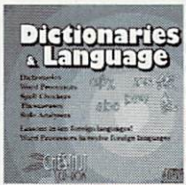

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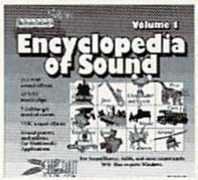

Produced by the The Music Factory, The Encyclopedia of Sound contains 250 sound files, including sound effects, voices, music clips, and full length original musical scores which may be used royalty-free for a wide variety of applications. The files are supplied in Windows' WAV format, and are (DDD) digitally recorded, mastered, and duplicated in full-range stereo. Also includes a large number of sound utilities.

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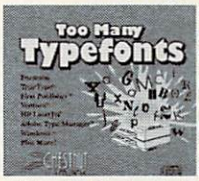

514 TrueType fonts; 393 ATM (Adobe Type 1) fonts, plus other typefonts in all formats. The disc also includes typeface modifiers, font managers and uploaders, translators, and tons of printer utilities for Postscript, DMP, HPLJ printers. Shareware.

Windoware

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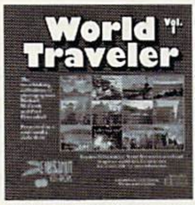

Photographers Michael McGrath and Paul Elmendorf have combined their extensive collections for a breathtaking multimedia slide show. The high resolution images which may be used royalty-free for a wide variety of applications. The files are supplied in PCX and GIF format, and are fully digitized and color corrected. The multimedia user-interface is simple and easy to use. The disc also includes a large number of graphics utilities.

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But there's no question about the quality of the SJ-144's text output. Standard characters have 48-dot-high definitions, doubling the precision of premium 24-pin printers, and the 360 dot-per-inch resolution bests most lasers. The crisp, jet black characters have a slightly glossy surface that makes them practically leap off the page.

With its unique 144-element printhead, the SJ-144 can print two and a half lines of text in a single pass. The result is very quick printing at a rate of 255 characters per second for 10 cpi pica text (equivalent to 2.3 pages per minute, according to Star). Most impressively, the SJ-144 delivers its highest level of quality at this speed. It has no provision for draft-quality printing, nor does it need one.

This printer might be hard to pigeonhole, but it's a snap to use. The Windows driver installs easily and includes 15 scalable TrueType fonts, usable from nearly all Windows programs. Under DOS, the SJ-144 supports the command sets of popular Epson and IBM printers for wide compatibility.

It's an extremely versatile printer. Overhead projection transparencies and iron-on transfer material are available from Star, as are special strip-label ribbon cartridges, containing ½-inch-wide pregummed label material in a variety of colors.

The $599 suggested retail price seems appropriate for its capabilities, near the top of the dot-matrix range but comfortably below most laser prices. Per-copy costs are modest. Ribbon prices are reasonable, while the built-in sheet feeder avoids the expense of continuous-form paper.

The SJ-144's biggest shortcoming involves graphics printing. Continuous-tone images like photographs are often spoiled by horizontal bands. The manual's "Optimizing Print Quality" describes an adjustment which helped a little, but never completely cured the problem.

Its color capabilities were also somewhat disappointing. Star claims "vibrant, full-color printing," but only solid, saturated colors came out well. And skin tones showed particularly weak reproduction. Color printing is also quite expensive. No matter how much (or little) of a color a row of pixels contains, the SJ-144 makes four passes over the row, using a different-colored segment of ribbon each time. For each pass, it advances the ribbon to find the next color, limiting the color ribbon's life to a scant eight pages.

But, in general, the SJ-144 is an attractive package, well-suited for home or low-volume office use. It isn't quite as fast as a laser printer, and the ribbon costs average out a bit higher than laser printer toner. But the lower initial price and no-compromises printing quality weigh in its favor. The SJ-144 is versatile and easy to use, and it's a good little printer overall.

TIM VICTOR

Star Micronics
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Does your old mouse make clicking a drag? International Microcomputer Software, Incorporated (IMSI) has two alternatives for you.

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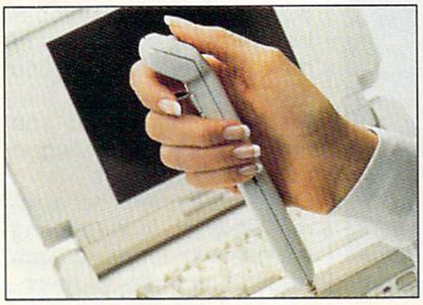

The PC Stylus can be held like a pen, or flipped over and used as a trackball.

left button—a position I occasionally found awkward.

If you work from a laptop or notebook PC, you'll be delighted that the Stylus doesn't need any desk space at all. You can use the Stylus on almost any surface—and if no surface is available, you can flip it over and use it as a thumb-driven trackball. The only Stylus-resistant surface I've encountered so far is, ironically, a mouse pad—the nonrubberized ball of the Stylus lacks the traction necessary for use on a mouse pad. The Stylus has an adjustable resolution of 400 to 1200 dpi. It comes with a vinyl carrying case and Cursorific, a program that lets you choose from a number of novelty cur-

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sor designs—just the thing for Windows users who are tired of looking at the same old arrow and hourglass.

For those of you who prefer a traditional mouse, the IMSI Mouse has a graceful, yet practical, design. It fits neatly in the hollow of your hand, with three equally sized buttons spaced for your fingers to reach naturally. The tracking speed is easily adjustable, so using the mouse requires minimal hand movement; the 6- × 8-inch pad included in the package provides more room than you'll really need. If you use a pointing device to create graphics, you'll appreciate the IMSI Mouse's resolution range of 290 to 2900 dpi, which allows for finer detail in creating designs onscreen. To take advantage of its high resolution, the IMSI Mouse is packaged with Image72 graphics software. The program supports a hand-held scanner as well as the mouse and can import and export a number of graphics and desktop publishing formats.

Besides the installation software, the IMSI Mouse and the IMSI PC Stylus come with MenuDirect Gold, a menuing program with a file manager, calendar, and calculator. Both packages provide adapters for 9-pin and 25-pin serial ports; the Stylus also includes an adapter for a PS/2 mouse port. And both packages are compatible with Microsoft, Mouse Systems, and Windows drivers.

ANTHONY MOSES

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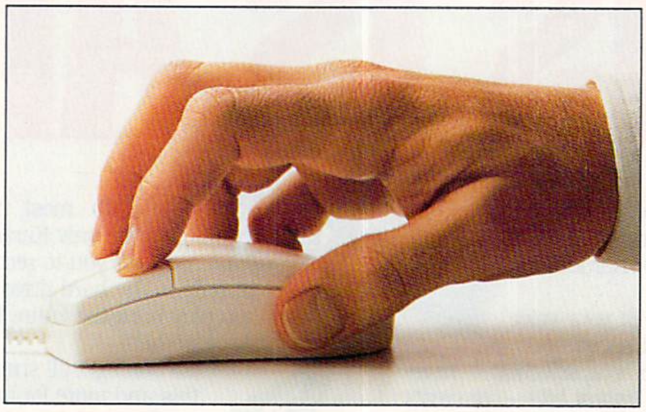
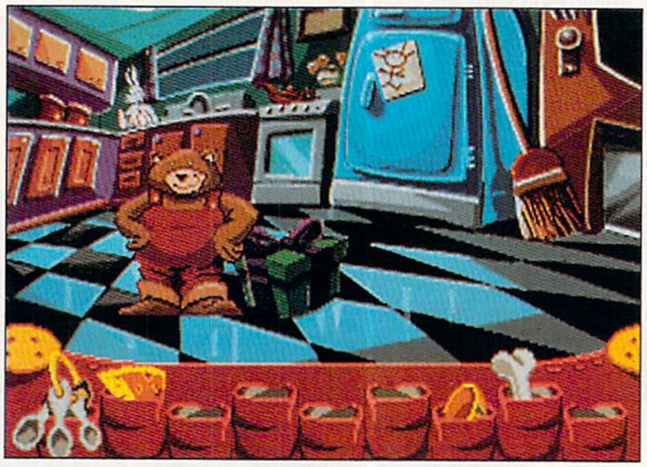


The IMSI Mouse has a graceful three-button design, adjustable tracking speed, and a resolution range of 290 to 2900 dpi.



You must guide Fatty Bear through more than 30 locations in his quest to find ingredients for a birthday cake.

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Children are natural explorers, and some of their first great adventures begin at home. Fatty Bear's Birthday Surprise finds comfort in such familiar surroundings, inviting youngsters to probe a pint-sized world of wonder, filled with magic, humor, and puzzles galore.

It's the middle of the night at Kayla's house, and her stuffed toys are restless. In a few short hours, it's Kayla's birthday. Fatty Bear springs to life to prepare a surprise party, with the help of Matilda Rabbit and Gretchen the doll. Your task is to guide Fatty Bear through more than 30 locations and wrap presents, make decorations, and find ingredients to bake a birthday cake. There's plenty to see and do as you explore the four-story house, garage, yard, and tree house.

There are also fun distractions that can keep you from your quest. Practice your math skills as you take in a few games of lawn bowling. Sit down at the piano to hear one of ten short tunes, or compose and save up to ten original songs. Many more diversions await, if you know where to look.

The title marks the third and best offering from Humongous Entertainment, a company cofounded by Ron Gilbert, creator of LucasArts' popular Secret of Monkey Island series. As you'd expect, Gilbert's influence is readily apparent in the game's singular graphic style and delightfully off-center sense of humor.

When children point and click on almost any object, they're rewarded with extravagant and inventive responses. Birdhouses don't just cheep, they detach from tree limbs and rocket about the yard. Lifeless bathrobes break into tangos, and normally sedate chairs gallop around the room. It's silly, yet quite sophisticated, and not at all condescending to developing intellects.

The designers do a remarkable job in structuring the game to appeal to each stage of its three- to seven-year-old target audience. For the youngest players, it's an attention-keeping, interactive festival of fluid animation, humorous sampled sound effects, and remarkably crisp digitized speech. Older kids will have no trouble reaching the end, and although the game's story line never changes, the sheer diversity of discovery beckons them to join in on Fatty Bear's birthday quest again and again.

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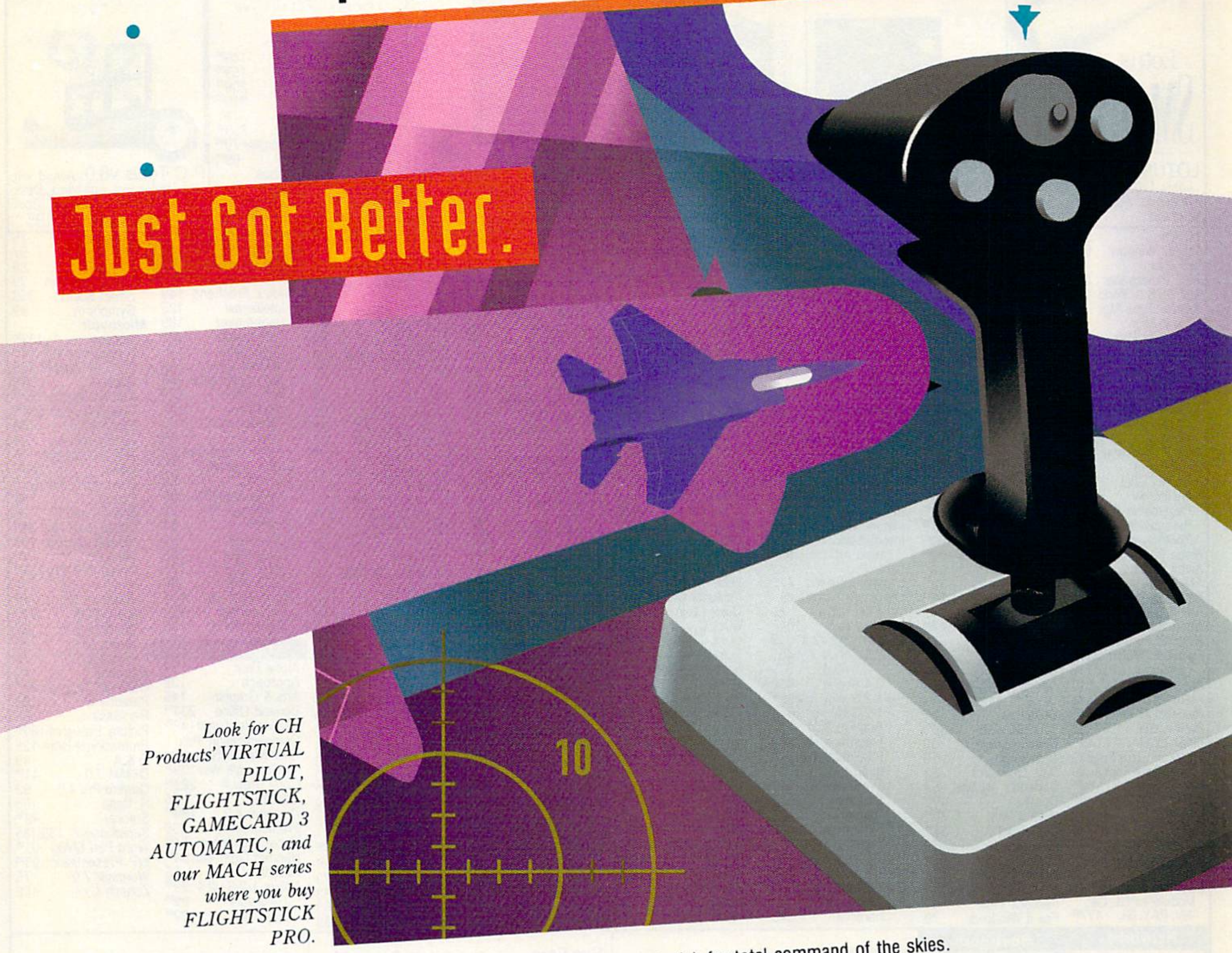

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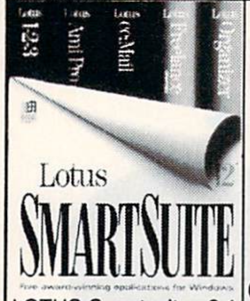

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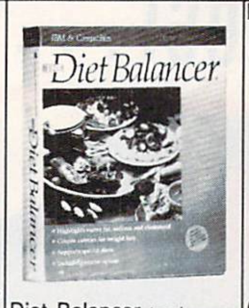

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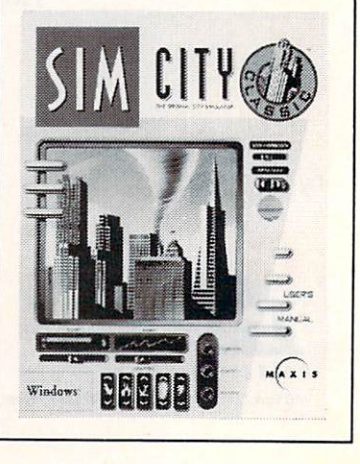

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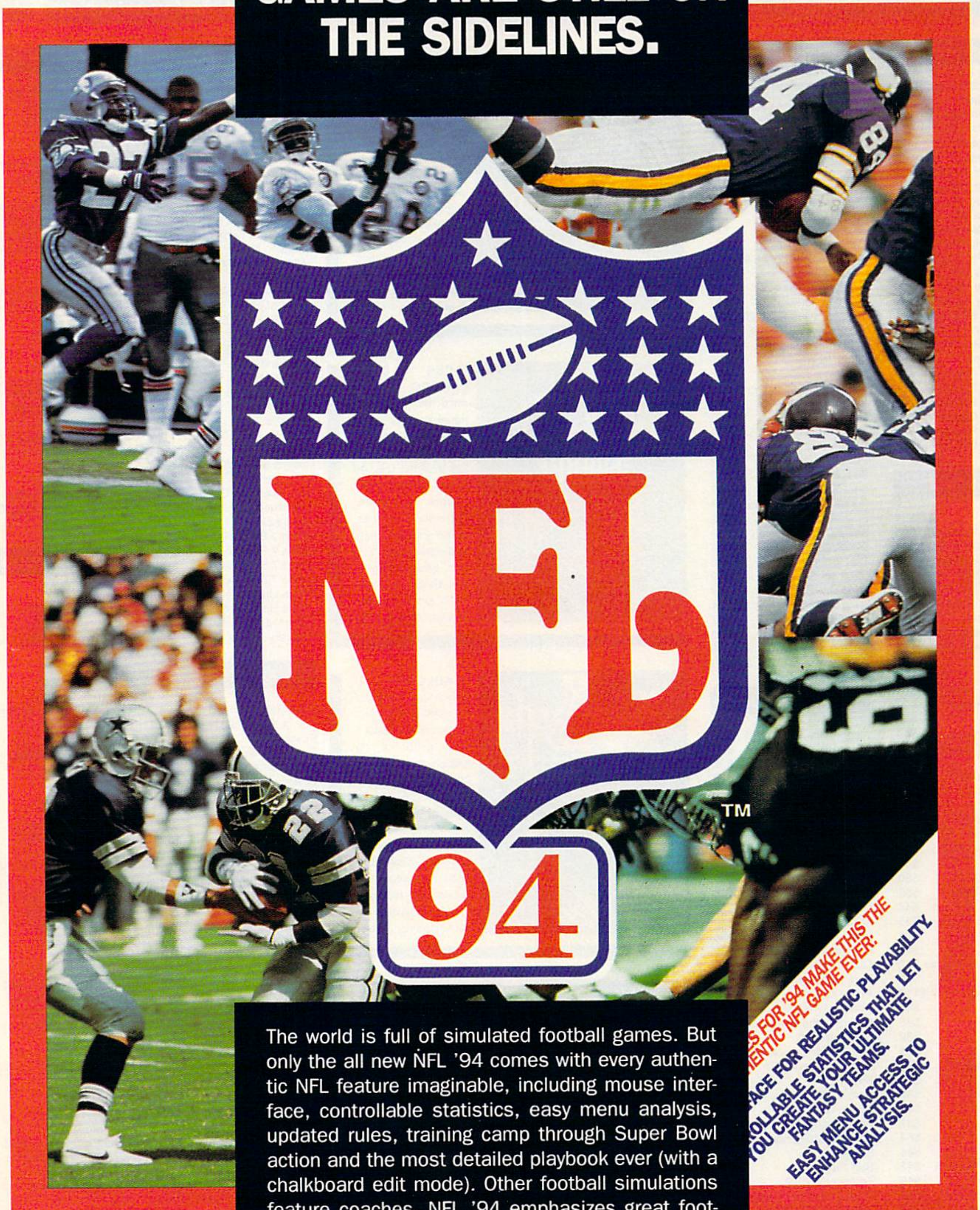
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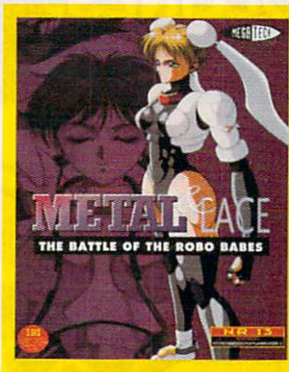
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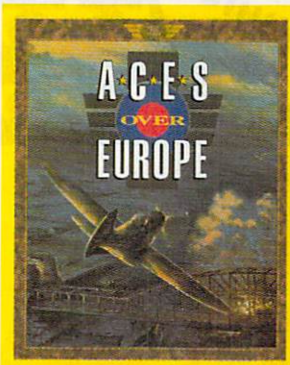

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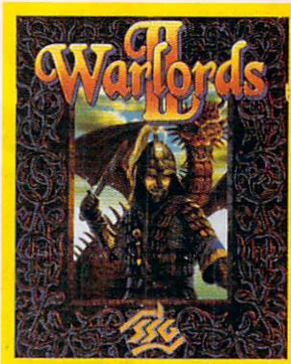

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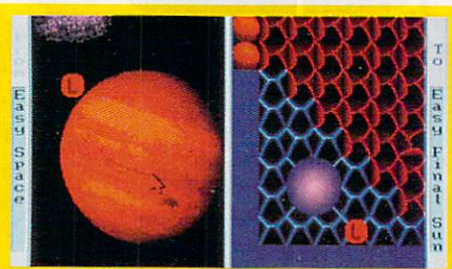

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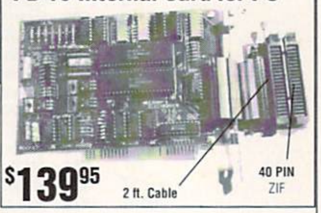

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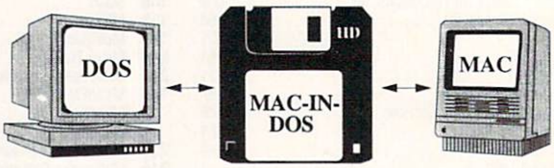

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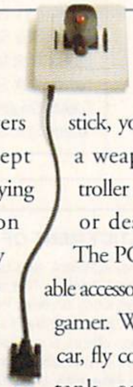

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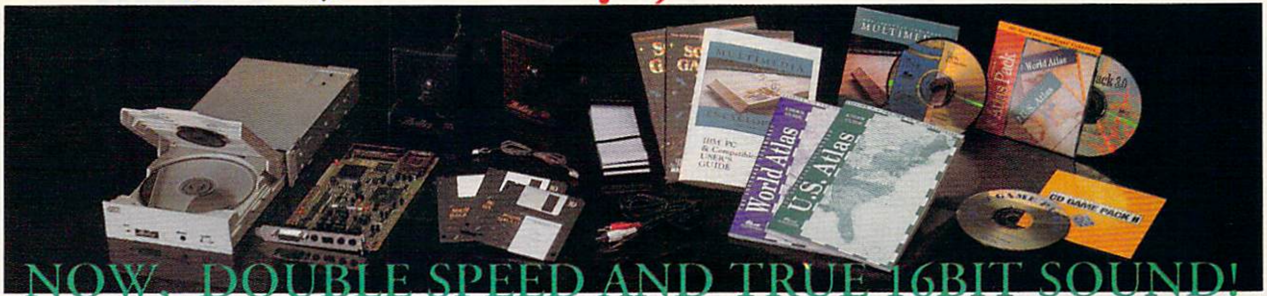

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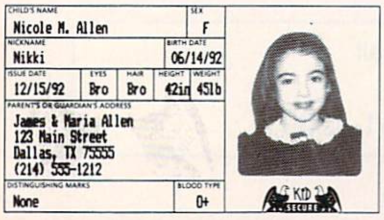

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SEX: F
NICKNAME: Nikki
BIRTH DATE: 06/14/92
ISSUE DATE: 12/15/92
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HAIR: Bro
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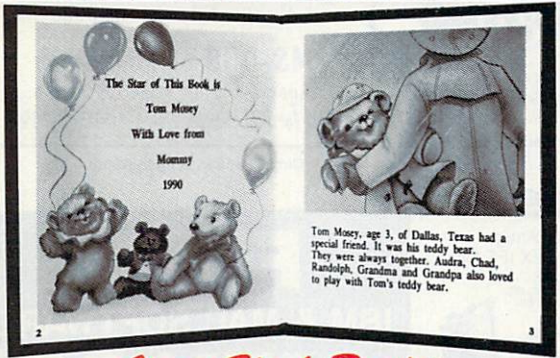

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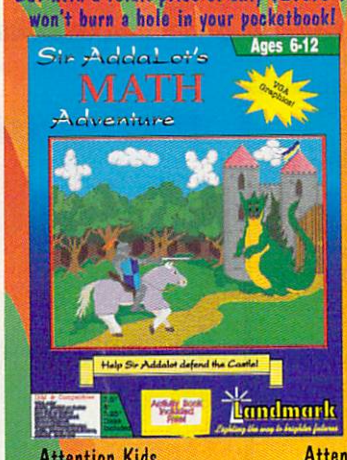
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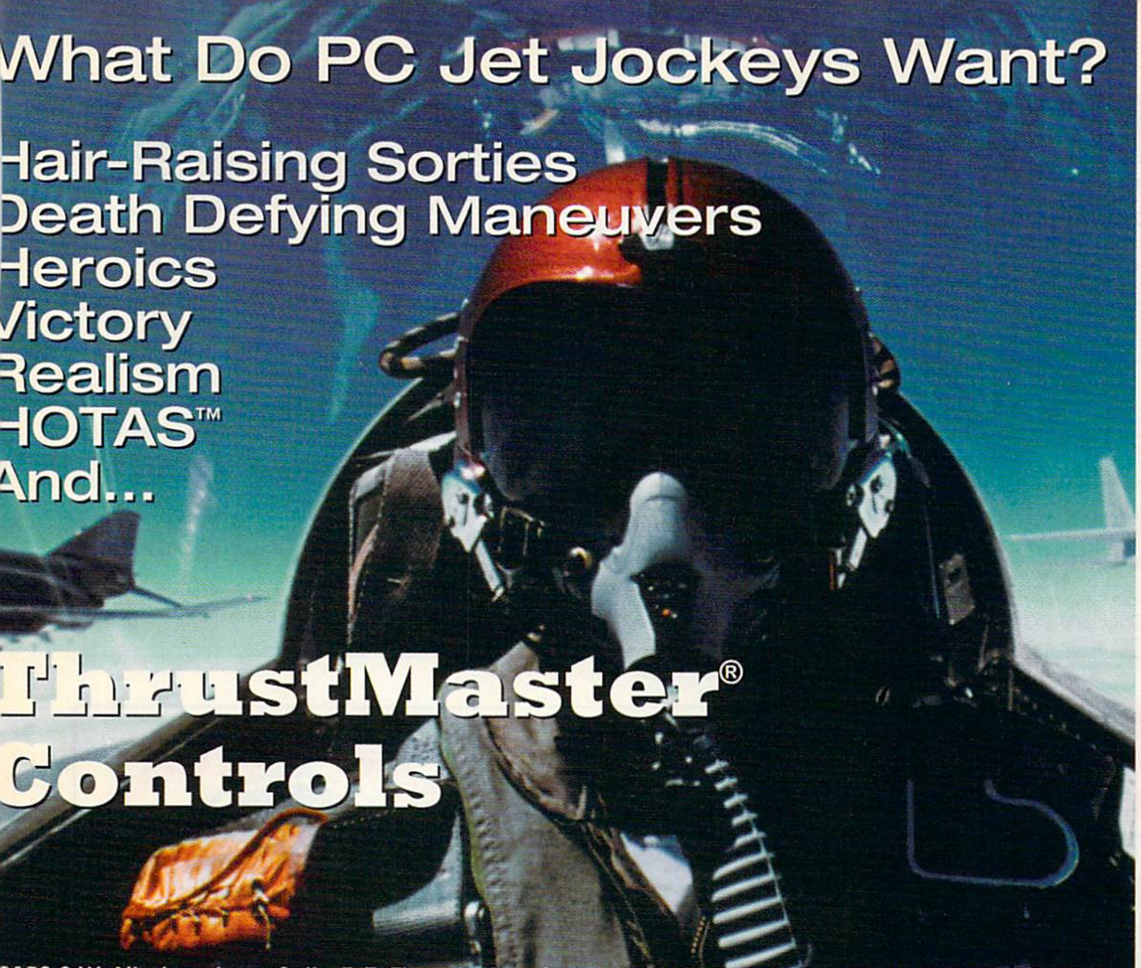

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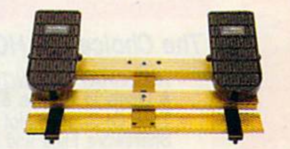

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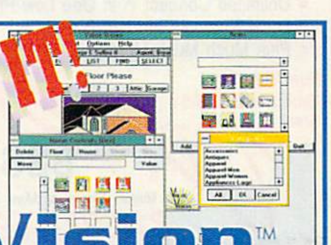

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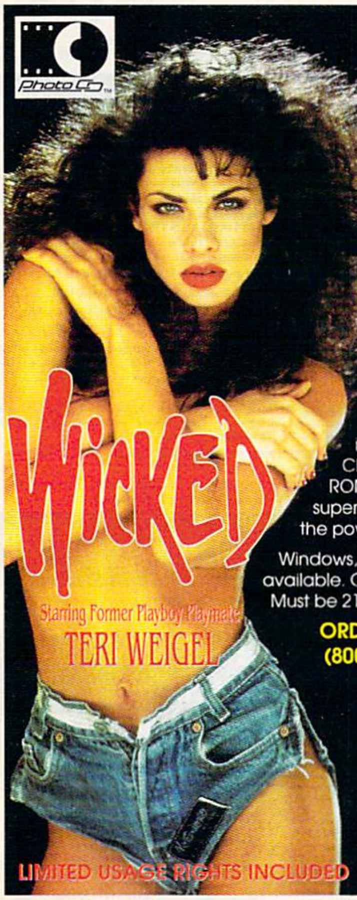
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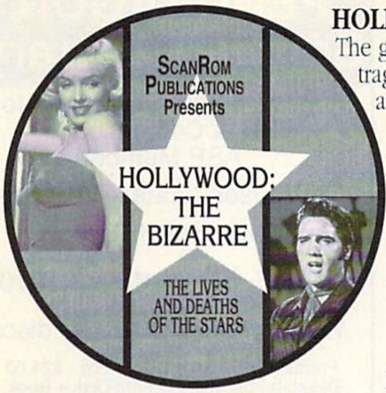

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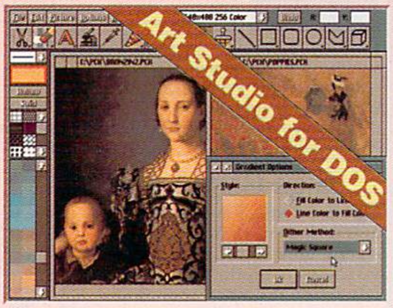

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NEWS BITS

Jill Champion Booth

Uncle Sam comes clean, COMPUTER IDIOTS converge (and consider multiplying), competitive computer intelligence goes Turing, and more

Online Government

Even the U.S. government is getting in on the online act, although perhaps not with boundless enthusiasm. According to the *Wall Street Journal,* after "mounting pressure" from public-interest groups, President Clinton signed a bill requiring the Government Printing Office to put Congressional proceedings and those of federal regulatory agencies online at low cost. And such groups apparently have no intention of letting up the pressure. The Taxpayer Assets Project, for one, wants greater public access to the Securities and Exchange Commission's corporate filings and the Justice Department's "vast electronic storehouse of laws and regulations," the *Journal* reports.

For now, the Library of Congress has set up a system allowing anyone to access the status of bills, resolutions, and amendments by dialing into Congress's internal database. And on a more personal note, the House Information Systems office is hoping to outfit every member of Congress with an E-mail box eventually. For an interesting perspective on where E-mail could eventually lead us as a nation, check out the "Political Science" column in the December issue of *Omni* magazine.

Mind Games

A competition for the next century—the National University Technology Center in San Diego, California, will host the third annual Loebner Prize competition on December 8. As in the past two years, it will be administered by the Cambridge Center for Behavioral Studies, an advanced-studies institute located in Cambridge, Massachusetts. The competition pits humans against computers: Human judges stationed at computer terminals attempt to determine whether they're conversing with fellow humans or with a computer. The author of the winning software in this year's competition will receive $2,000 and a bronze medal. Eventually, says Dr. Robert Epstein, chairman of National University's psychology department and facilitator of all three contests, the Cambridge Center will conduct an open-ended contest in which the topics of conversation will be unrestricted and a prize of $100,000 will be awarded to the winner.

Named after Dr. Hugh G. Loebner of New York City, the Loebner Prize competition was inspired by computer pioneer Alan Turing, who in 1950 posed his famous question, "Can computers think?," and came up with a test for machine intelligence much like this competition: If a person conversing with a computer cannot tell whether he or she is conversing with a computer or another person, then the computer can be said to be exhibiting intelligence.

The Idiots Are Coming

Former computer idiots dressed in COMPUTER IDIOT T-shirts are there to help you face your fear of computers. Get the picture? They're *former* idiots now working in a new concept store in Ventura, California, called—what else—the COMPUTER IDIOT PC Store. The concept is the brainchild of the SoftMark people (2734 Johnson Drive, Ventura, California 93003; 805-650-5980), who have been releasing products under the trademark of COMPUTER IDIOT since 1990, including *The Original COMPUTER IDIOT PC User's Guide.* Since the store specializes in first-time computer users, there's no such thing as asking an idiotic question. Whether it's training adults or children in the basics of computers, showing the latest in education software, or renting out machines by the hour, the store's goal is to provide customers with quality computer training, products, and service at reasonable prices and, of course, to make them feel at home with the technology.

But should the store be called something more flattering—say "Einstein's"? Not according to Martin Duran, one of the founders: "People call and say, 'You named the store after me!' The name brings them in, and our vendors love it."

Since franchising the concept is in the works, a store for computer idiots could come to your neighborhood.

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Participating retailers currently include ComputerLand, THE FUTURE NOW, Government Technology Services, and Software Spectrum.

So far, software publishers participating include Borland, Delrina, KnowledgeWare, Lotus, VisiSoft, and IBM. Major players Microsoft and WordPerfect may soon add their names to the list. ❐

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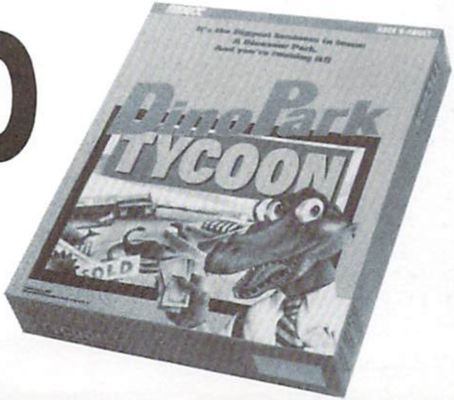
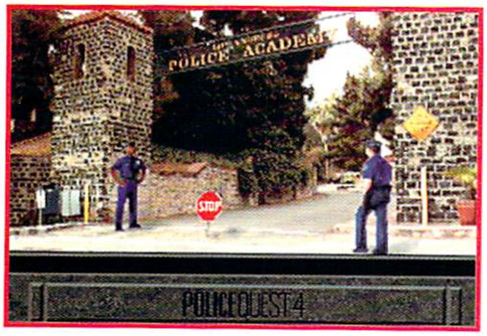
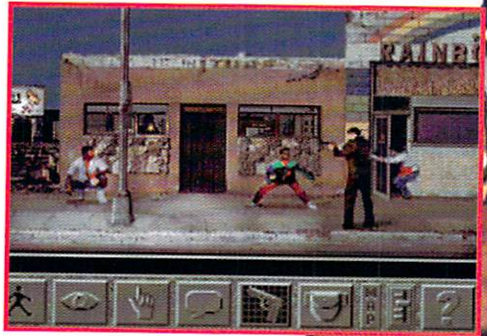


By endorsing this check the undersigned represents that it is an authorized MECC retailer.

LOOK
INSIDE
For
your
Key to
Adventure!
SIERRA®

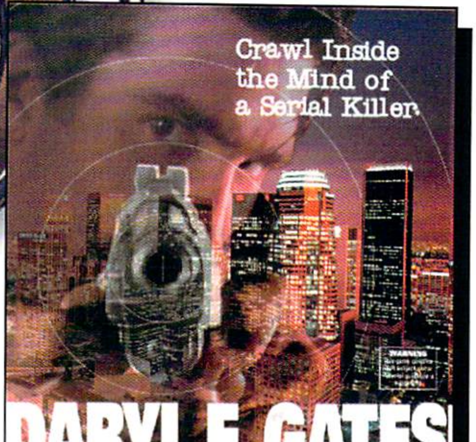

POLICE ACADEMY
STOP
POLICEQUEST 4

No other adventure takes you so fully into the life of a cop.



Real life crime drama, authored by the nation's most experienced cop.

Uncover key evidence at the crime scene...

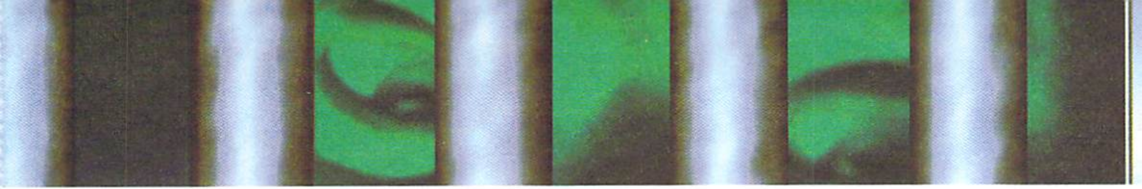

Crawl Inside the Mind of a Serial Killer
DARYL F. GATES
POLICE QUEST
SIERRA

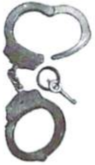
Daryl F. Gates'

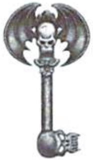
POLICE QUEST®

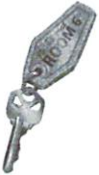
OPEN SEASON

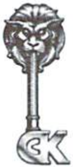
SIERRA®











Use Your *KEY TO ADVENTURE* to Unlock Great Prizes from Sierra!

Take this *Key to Adventure* card to your favorite participating retail outlet and see if your keys match the keys on the Sierra poster. If your key pattern matches any pattern found on the poster, you'll win a fabulous prize from Sierra! We're giving away a ton of stuff!

One State-of-the-Art Multimedia Personal Computer!
Two *MediaVision* Multimedia Computer Upgrade Kits!
25 *Gravis* UltraSound Sound Boards!
50 *Sierra* Adventure Games!
2,000 *Sierra* Hint Books!

000006708

DID YOU WIN??

If so, fill out the information below and mail this card to:

Sierra On-Line, Key Contest, P.O. Box 485, Oakhurst, CA 93614

Name____

Address______________________________________

City____________________State________________Zip Code__________

Phone Number:(   )_____________________________

I have won:

____ A multimedia PC

____ A multimedia upgrade kit

____ A sound card

____ A Sierra Game. I would like:

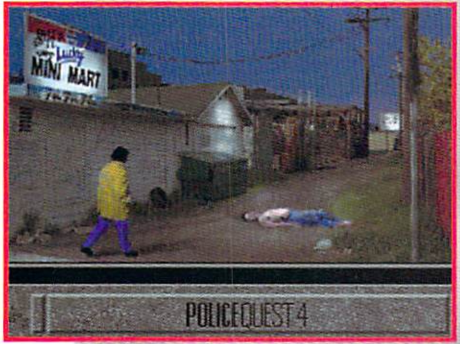
____ *Gabriel Knight* ____ *Leisure Suit Larry 6* ____ *Open Season* ____ *Shadows of Darkness*

____ A free hint book. I would like:

____ *Gabriel Knight* ____ *Leisure Suit Larry 6* ____ *Open Season* ____ *Shadows of Darkness*

Prizes subject to verification.

Quest For Glory: Shadows of Darkness



Daryl F. Gates *Police Quest: Open Season*

Gabriel Knight: Sins of the Fathers

Leisure Suit Larry: Shape Up or Slip Out!

WIN ONE OF THESE GREAT PRIZES!

One *Gateway* State-of-the-Art Multimedia Computer!

Two *MediaVision* Multimedia Upgrade Kits!

25 *Gravis* UltraSound Sound Boards!

50 new *Sierra* adventure games!

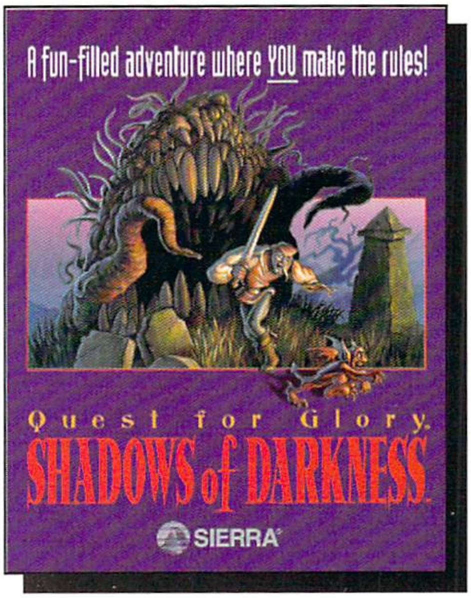
2,000 *Sierra* hint books!

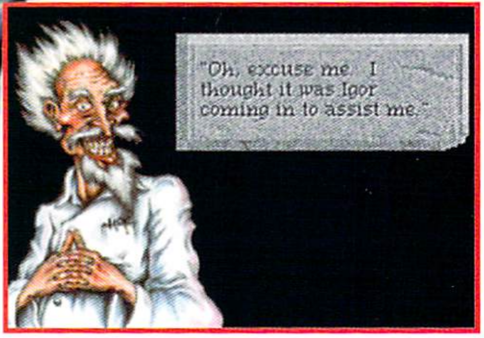
LOOK INSIDE
(See back for contest details)

SIERRA®

Put a headlock on vicious vampires...

A sinister setting and a sophisticated gaming system add up to an unparalleled adventure.


A fun-filled adventure where YOU make the rules!
Quest for Glory
SHADOWS of DARKNESS
SIERRA



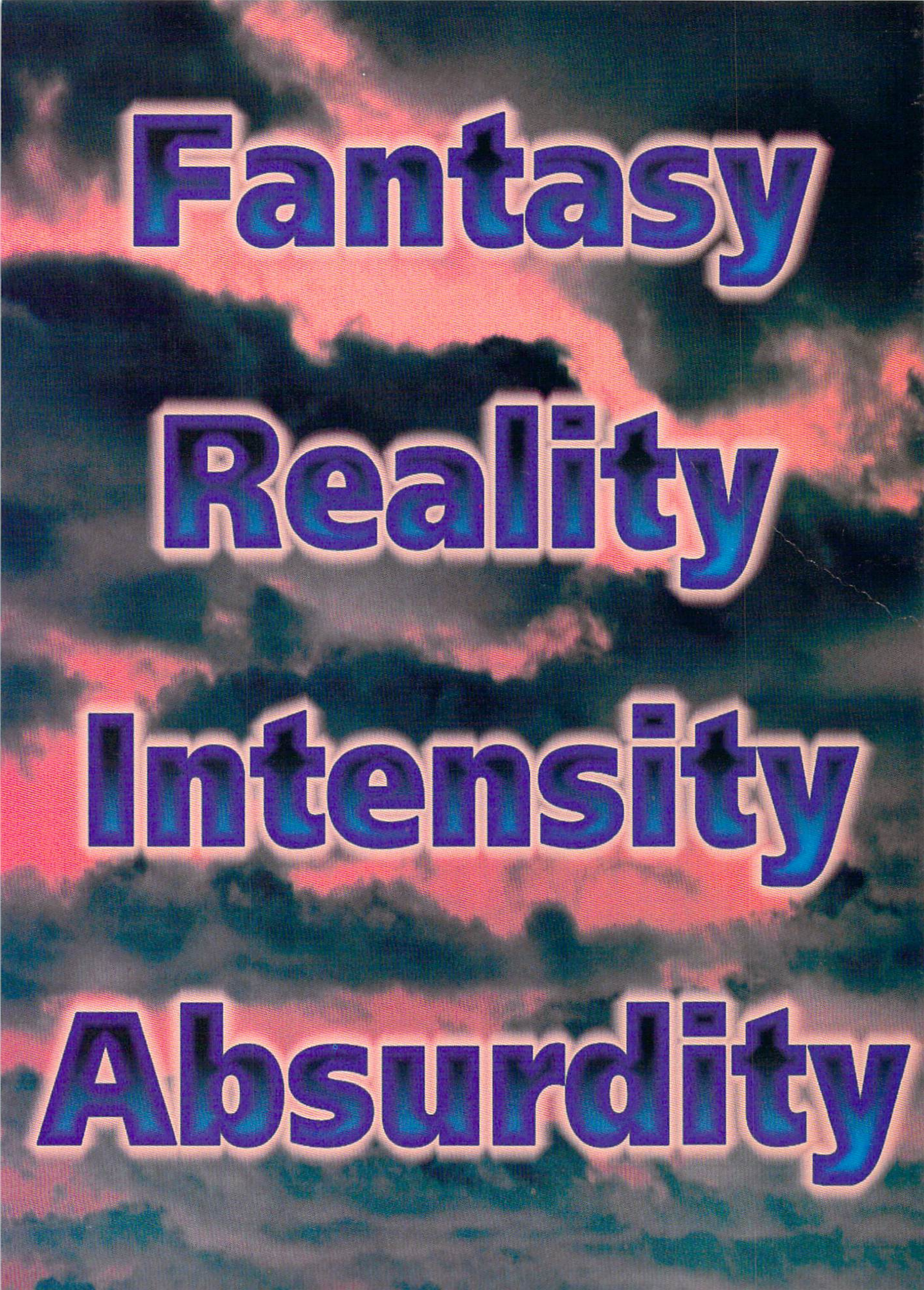
"Oh, excuse me. I thought it was Igor coming in to assist me."

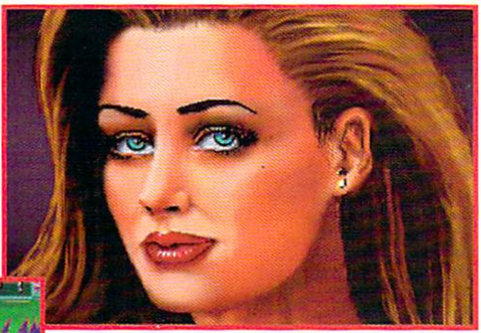
Characters (many of them as strange as this one) appear full screen during conversation.

QUEST FOR GLORY®

Shadows of Darkness

SIERRA®


Fantasy
Reality
Intensity
Absurdity



More babes than ever. Nine of 'em. And all in beautiful hi-res!

It's the whackiest, wildest, most laugh-filled Larry ever!

You'll be on top of the world when you play Leisure Suit Larry.

La Costa Lotta Spa
ROOM 6

Lock out Larry's loneliness at La Costa Lotta Spa...

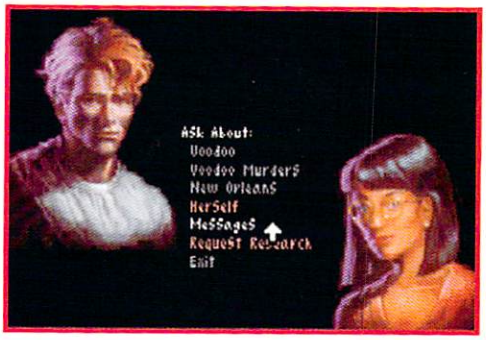
LEISURE SUIT LARRY®

Shape Up Or Slip Out

SIERRA®

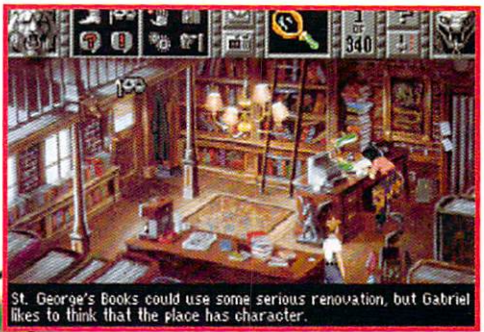
Find the key to one man's haunted past...

GABRIEL KNIGHT
ONLY ONE MAN CAN STOP THE NIGHTMARE
SIERRA
GK


Ask About:
Voodoo
Voodoo Murders
New Orleans
Herself
Messages
Request Research
Exit

An all-new interrogation feature lets you delve deeper into the psycho-thriller.

An advanced icon-bar makes Gabriel Knight *a master-level adventure.*



St. George's Books could use some serious renovation, but Gabriel likes to think that the place has character.

GABRIEL KNIGHT™

Sins of the Fathers

SIERRA®

Key to Adventure Contest!

1. Remove the *Key to Adventure* card. You can also write to Sierra to receive a *Key to Adventure**. Write to:

   ***Key to Adventure* Contest, P.O. Box 485, Coarsegold, CA, 93614**

2. Take it to any participating software retail outlet.
3. Check the key sequences on the poster.
4. If your key pattern matches any pattern found on the poster, you'll win a fabulous prize from Sierra! We're giving away the following:

One* Gateway *State-of-the-Art Multimedia Computer!

Valued at $3299.00

Two* MediaVision *Multimedia Computer Upgrade Kits!

Each valued at $899.00

25* Gravis *UltraSound Sound Boards!

Each valued at $199.00

50* Sierra *adventure games!

(featured inside)

Each valued at $69.95

2,000* Sierra *hint books!

Each valued at $9.95

So why are you still sitting there? Grab your *Key to Adventure* and get going!

Check your *Key to Adventure* card at these and other participating computer retail stores:

CompUSA, Computer City, Electronics Boutique, Incredible Universe, Software Etc.

Odds of winning PC:	1 in 1,700,000.
Odds of winning upgrade:	1 in 850,000.
Odds of winning sound card:	1 in 68,000.
Odds of winning Sierra game:	1 in 34,000.
Odds of winning Sierra hint book:	1 in 850.

Eligibility requirements: All contestants must be 18 or older to participate. Employees and their families of Sierra On-Line, Inc., its affiliates, and outside materials suppliers, are not eligible. Good only in the United States and Canada. Contest void where prohibited by law. No purchase necessary to win.

For a complete list of contest rules and prizes, send a self-addressed stamped envelope along with your request by December 15, 1993.

Contest ends January 31, 1994. Write-in requests must be postmarked by December 31, 1993. Prizes must be claimed, in writing, by February 28, 1994.

Please allow 4-6 weeks delivery of prizes after receipt of winning contest cards at Sierra.

Unclaimed prizes will remain the property of Sierra On-Line, Inc.

*while supplies last

Sierra Publishing Division is a developer and publisher of premium entertainment and educational software. Sierra Publishing is a division of Sierra On-Line, Inc., located at 40033 Sierra Way, Oakhurst, Califonia, 93644.

SIERRA®

Gateway *State-of-the-Art Multimedia Computer!*

Fusion DoubleCD 16

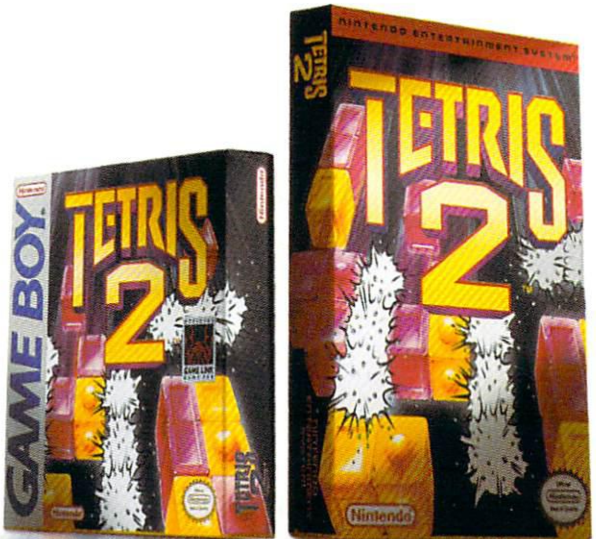
MediaVision *Multimedia Computer Upgrade Kits!*

ULTRASOUND
PC Sound Board
GRAVIS

Gravis *UltraSound Sound Boards!*

Sierra *hint books*

“&O!@*!
%*?#@”


NINTENDO ENTERTAINMENT SYSTEM
TETRIS 2
GAME BOY
TETRIS 2
Nintendo
Nintendo

[Tetris 2™. Everything you loved about the original and more.]

How much fun is new Tetris 2? Words can't describe it. Well, not words we can print anyway. Just imagine doing a jigsaw puzzle in a minefield, with a gun at your head. If that sounds like fun, you don't need help. You need Tetris 2. Nintendo®

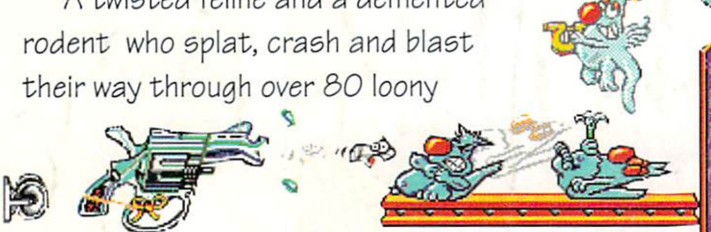
TETRIS 2 IS HERE ON NES® & GAME BOY®

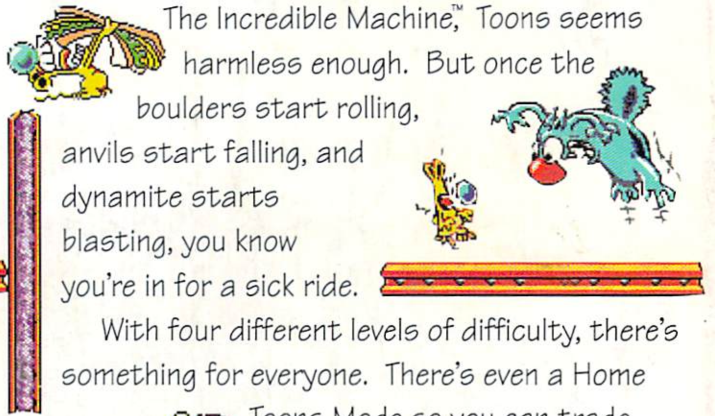
TM & © 1987 Elorg. Licensed to Nintendo. © 1989, 1993 Nintendo. Game Boy Tetris licensed from BPS. Original Tetris concept, design and program by Alexey Pazhitnov.

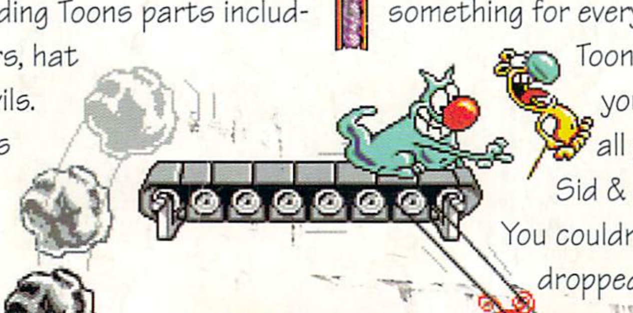
Circle Reader Service Number 215

Sid & Al's INCREDIBLE Toons™

BOING! CRASH! SPLAT! EEK! FLUSH! AND THAT NAUSEATING SOUND A CAT MAKES HOARKING UP A HAIRBALL.







That's Al E. Cat and Sid The Mouse.

A twisted feline and a demented rodent who splat, crash and blast their way through over 80 loony Rube Goldberg-style puzzles and over 75 mind-bending Toons parts including hair dryers, hat pins, and anvils.

Welcome to Sid and Al's Incredible Toons.™ Following in the footsteps of its award-winning predecessor, The Incredible Machine,™ Toons seems harmless enough. But once the boulders start rolling, anvils start falling, and dynamite starts blasting, you know you're in for a sick ride.

With four different levels of difficulty, there's something for everyone. There's even a Home Toons Mode so you can trade your maniacal cartoons with all your deranged friends.

Sid & Al's Incredible Toons. You couldn't have more fun if you dropped an anvil on your own head.

Dynamix®
PART OF THE SIERRA FAMILY

Available at retail for IBM/compatibles. Or call 1-800-757-7707.

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